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# THE CULTURAL AFFILIATIONS AND CHRONOLOGICAL POSITION OF THE CLEAR FORK FOCUS

J. CHARLES KELLEY

## INTRODUCTION

THE importance of the Clear Fork Focus[1] as a pre-pottery archaeological complex of north-central Texas has become generally known to archaeologists through the industry of its discoverer and principal proponent, Dr. Cyrus N. Ray, of Abilene, Texas. Unfortunately, the relationship of this complex to other and comparable archaeological cultures of Texas has been largely neglected and some regrettable misinformation in regard to its chronological position has been widely disseminated.[2] In this paper the cultural affiliations and age of the Clear Fork Focus will be discussed in terms of the evidence presented by its discoverers and from the standpoint of new data derived from large scale excavations completed by the University of Texas in the terraces of the Colorado River near Austin, Texas. Additional information obtained by the writer through study of some twelve thousand projectile points from central, south, and western Texas, and their geographic and temporal distribution also is used.

## I. THE CLEAR FORK FOCUS

Only summary accounts of the complex have been presented. No detailed site reports have been published and even the evidence for the existence of the complex as such has never been presented.[3] Judging from the published descriptions, occupation sites of the focus are characteristically groups of small hearths with scattered charcoal, animal bone fragments, flint chips, and artifacts, usually found eroding from the shallow fill of mountian valleys or deeply buried in the alluvium of stream terraces. Artifacts assigned to this complex include four types of stone dart points, a specialized stone end scraper or "gouge," flint side scrapers, "spokeshaves," gravers, awls, hand axes, discs, and abrading stones.[4] Of these, the stone dart points and the gouges are considered especially diagnostic. Ray's "Clear Fork Darts 1 and 2" are referred to in this paper under the name "Nolan Beveled Stem" (Pl. X, *d*), his "Clear Fork Dart 3" as "Baird Beveled Blade" (Pl. X, *a*), and his "Clear Fork Dart 4" as "Taylor Thinned Base" (Pl. X, *b*).[5]

[1] This complex was named the "Clear Fork Culture" by Cyrus N. Ray (Ray, 1934, p. 111). In 1935 E. B. Sayles described the same complex under the name "Abilene Branch" (Sayles, 1935, pp. 46 and 117; Tables 4, 9, 13; Pls. IX and X; Map A, p. 128). A more detailed description was given by Ray in 1938 (Ray, 1938), and in 1941 Sayles accepted Ray's term "Clear Fork Culture" for the manifestation (Ray and Sayles, 1941). The term "Focus" is substituted for "Culture" in the present discussion to facilitate discussion of the complex in relation to other cultural complexes of the state which have been classified in terms of the McKern system.

[2] Thus, McGregor in 1941, using Sayles' term "Abilene Culture," referred to the complex as an extremely early culture, probably contemporaneous with the terminal Wisconsin ice age of some twenty thousand years ago (McGregor, 1941, pp. 106–7 and Fig. 25). Roberts in 1940 and 1945 considered the circumstances somewhat more cautiously and concluded that the age of the complex was probably late Wisconsin or Early Recent (Roberts, 1940, pp. 73–80, 84–5; Roberts, 1945). Wormington has repeated this same time estimate (Wormington, 1944, pp. 39–41).

[3] In 1942 the writer visited Dr. Ray at Abilene in order to ascertain the facts regarding the Clear Fork Focus. Unfortunately, circumstances apparently made it impossible for Dr. Ray to supply at that time the desired information as to the distribution of artifact types by components. He was extremely cooperative, however, in conducting the author and Mr. Alex Krieger on a tour of his various deeply buried sites. This courtesy was appreciated.

[4] Ray, 1938; Sayles, 1935; Ray and Sayles, 1941.

[5] The writer has used the binomial system of type terminology in analyzing and classifying Texas projectile points.

These and other artifacts putatively diagnostic of the focus have been described elsewhere by both Ray and Sayles.

## II. ESTIMATED AGE OF THE CLEAR FORK FOCUS

In 1938 Ray pointed out the difficulties involved in accurately placing the Clear Fork Focus chronologically, but concluded that it must have existed either earlier than the Folsom Culture or contemporaneously with the latter. Apparently, this opinion was based on (*a*) the thickness of alluvial deposits overlying the strata in which Clear Fork artifacts occur, (*b*) the location of the sites along streams now dry, (*c*) association of Clear Fork artifacts with Folsom artifacts on erosional surfaces, (*d*) advanced patination of Clear Fork artifacts, and (*e*) their typological similarity to artifacts of the European Paleolithic.[6] It is inferred from Ray's more recent discussions that he now considers the Clear Fork Focus to have been contemporaneous during the late Wisconsin with the Folsom Culture, and to have survived into the Early Recent period. This new concept is based on the relative position of Folsom and Clear Fork in the geological stratigraphy of the Abilene region.[7]

Sayles identified the Clear Fork complex (i.e., his "Abilene Branch") as the oldest cultural horizon in Texas, placing it earlier than Folsom in his chronological chart. He pointed out that such a placement was entirely suppositional, however. The basis for this dating he found in (*a*) the frequent association of Clear Fork artifacts with those of other cultures of reputedly great antiquity, (*b*) the stratigraphic position of Clear Fork sites beneath thick overburdens of alluvium, and (*c*) the persistent patination of Clear Fork artifacts.[8] Later, Sayles specifically identified the Clear Fork (Aiblene Branch) as of Wisconsin age, basing this opinion on the occurrence of the complex in the Elm Creek Silts, assigned by Leighton to the Wisconsin period.[9]

The rather widespread acceptance of the Wisconsin dating of the Clear Fork Focus seems to be due in large part to the published conclusions of Dr. M. M. Leighton, who, in 1934, made a three day reconnaissance of the Abilene region at the request of Gila Pueblo. As a result of this survey he divided the valley alluvium of the region into two formations, an older, the Durst Silts, and a younger, the Elm Creek Silts. The Durst Silts had been considerably weathered and eroded prior to the deposition of the overlying Elm Creek Silts. Since both formations were reported to contain the remains of extinct fauna, and because of their indicated origin in extensive slack water silting under more humid conditions than those now existing, Leighton concluded that they must be of Pleistocene age. Furthermore, the soil profile at the top of the Elm Silts suggested a time span possibly equivalent to that of the Recent period. At the top of the underlying Durst Silts a mature soil profile was observed. In Leighton's opinion the formation of such a soil profile required a considerable time span, possibly equivalent to that having elapsed since the Illinoisian glaciation. He therefore reached the tentative conclusion that the Durst Silts were deposited during an older Pleistocene substage, presumably Illinoisian, and weathered during the ensuing Sangamon interglacial period, and that the Elm Creek Silts were deposited during the Wisconsin glaciation, or in the Early Recent, and were weathered during the subsequent Recent period.[10]

According to Sayles, Clear Fork (Abilene Branch) artifacts appear in the Elm Creek Silts, probably in their lower strata to judge from his chart, and following Leighton's dating must, therefore, be of Wisconsin age. Ray, however, in 1940 denied that the Clear Fork complex had been found in the Elm Creek Silts.[11] He reaffirmed this opinion in 1945,[12] even though he had in the meantime discovered Clear Fork artifacts in the extreme upper part of the Durst Silt, or at the Durst-Elm Creek contact, and in the lower stratum of the Elm Creek Silts. For reasons which are not stated, he thereupon reclassified, without the assistance of professional geologists, the alluvial deposits of the region.

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Ray's terms have been replaced with those used here for purpose of consistency in nomenclature and in order to divorce the type name from the complex name, especially in view of the fact that the association of the types concerned in the Clear Fork Focus has not been demonstrated. There is no intention of depriving Dr. Ray of the credit for naming the types.

[6] Ray, 1938, pp. 193, 197, 206.

[7] Ray, 1945.

[8] Sayles, 1935, p. 46 and Table 13.

[9] Sayles, in Leighton, 1936, p. 38 and Fig. 5.

[10] Leighton, 1936.

[11] Ray, 1940*a*.

[12] Ray, 1945*b*, p. 29.

The Durst Silts and the lowest member of the overlying Elm Creek Silts, together with the intervening disconformity were grouped together and labeled the "Clear Fork Silts," while the upper strata of the Elm Creek Silts were renamed the "Nugent Silts."[13]

There are obvious objections to many of the claims outlined above, to the evidence adduced in their support, and to the theoretical assumptions, explicit and implicit, on which the conclusions are based. Specific criticisms, however, will be given below following presentation of the new evidence.

### III. CULTURAL AFFILIATIONS OF THE CLEAR FORK FOCUS

The Clear Fork Focus is only one local manifestation of a widespread archaic cultural horizon which is especially well represented in central, southern, and western Texas. The traits listed by Ray and by Sayles as characterizing the Clear Fork Focus, with the sole exception of the specific types of dart points, are likewise common and characteristic traits of several other foci of this culture horizon, which is tentatively termed the Balcones Phase.[14] Furthermore, if the numerous flexed burials of dolichocranial individuals in stone slab cysts reported by Ray from the Abilene region[15] belong to the Clear Fork Focus, as seems probable, then none of the common traits of the Balcones Phase are lacking in the focus, with the possible exception of grinding stones. The Clear Fork Focus is closely related to the Round Rock Focus,[16] which reached its highest development along the Colorado River near Austin, and is probably best grouped with this focus in the Edward Plateau Aspect. Lack of detailed site reports makes assured classification of the Clear Fork Focus difficult, however.

The principal diagnostic element of the Clear Fork Focus is Nolan Beveled Stem point (Pl. X, *d*), presumably in association with Baird Beveled Blade and Taylor Thinned Base points (Pl. X, *a*,*b*.) The primary diagnostic element of the Round Rock Focus is Pedernales Indented Base point (Pl. X, *c*) in association with various minor dart point types. The relative geopraphic distribution of Nolan Beveled Stem and Pedernales Indented Base points, and accordingly of their respective foci, is indicated very roughly in Figure 9, A.[17] "Gouges" are reported to occur

[13] Ray, 1945*a*. Ray presents no reason for this reclassification. The Durst Silts and the lowest member of the Elm Creek Silts have nothing in common except, reputedly, the occurrence in both of Clear Fork artifacts. The two strata are disconformable and, as Ray himself admits, extinct faunal remains are found in the Durst but not in the Elm Creek. He makes no comment on the comparative lithology of the strata. As a result of Ray's action the incredibly confused terminology of the Abilene region is further confounded by two new stratigraphic terms tangent to the older terms which they are intended to supplant.

[14] Included in this phase are the archaic cultures of the Edwards Plateau, the Gulf Coastal Plain, and the closely related cultures of the Big Bend Aspect, found in the rock shelters of western Texas. The Balcones Phase, named from the Balcones Escarpment which serves as its geographical axis, has many general and specific relationships with the archaic cultures of the southeastern United States on the one hand as well as with the pre-pottery "desert cultures" of the Southwest and early horizons of coastal California on the other hand. Discussion of the broader affiliations of this phase must await a later paper.

[15] Ray, 1929, 1933, 1937; Hooton, 1933. No diagnostic types of artifacts have been found with these burials and their cultural affiliation is accordingly uncertain.

[16] The Round Rock Focus was first identified by Sayles (1935, pp. 53–5, "Round Rock Phase," Pl. XIV, Tables 4, 9, 13, Map D). Actually, the Round Rock Focus as here defined probably includes both Sayles' Round Rock and his Guadalupe River Phase (p. 53, Pl. XIII, Tables 4, 9, 13, Map D). Evidence at present available does not seem to justify the hypothesis of separate foci as indicated by Sayles.

[17] The distribution map is far from satisfactory. The county unit, rather than the site unit, was used in plotting distributions, since the exact provenience of some collections was unknown. Many counties were represented by few sites and specimens, or by none at all. The maximum distribution of each type was plotted by drawing a line through those peripheral counties in which the type was represented by the least number of specimens. The nuclear areas of distribution of the types, bounded arbitrarily by a line enclosing the upper 80 per cent of the distributional range, were assumed to represent the home territory of the foci. Thus, the range of Pedernales Indented Base distribution expressed as a percentage of all the dart points (but excluding arrow points) in each county unit was zero to 61 per cent. To facilitate comparison, the percentage values for the type were recalculated in terms of the range and the resulting values (zero to 100 per cent) were plotted on the map. The values from 20 per cent to 100 per cent then appeared grouped in centrally located and adjacent county units; those below 20 per cent were peripheral and widely dispersed. The upper 80 per cent of the range, therefore, seemed to represent the area of concentration, hence the focal area. Preparation of adequate distribution maps must await compilation of numerically adequate distributional data for numerous traits, and should be based on components as units. Lacking such data, the present map has been used, since it probably indicates fairly well the

in large numbers in Clear Fork components, although no statistics have been published, and grinding stones are probably rare. In Round Rock Focus components, the few gouges that occur probably indicate Clear Fork Focus admixture. Conversely, manos and grinding slabs are relatively numerous in Round Rock componets. The presence of flat pebbles notched on the short axis, numerous spike-like blades, and certain specialized artifacts of rare occurrence are other diagnostics of the Round Rock Focus which have not been reported from components which are predominantly Clear Fork in affiliation.

Regardless of the rather clear distinction thus indicated in detail between the two foci, the majority of artifacts from their respective components are almost identical in categories represented, actual types present, and even in relative frequencies of types, excepting only those diagnostic traits and types noted. Furthermore, over much of central Texas components of the foci are almost invariably mixed in varying degrees; "pure" components of either focus are almost entirely lacking. South of Austin, the percentage of Clear Fork types in given components is low; as one moves northwest from Austin along the Colorado River all components become increasingly Clear Fork in cultural composition. Southward, eastward, and westward from Austin the reverse situation holds true (Fig. 9, A).[18]

General contemporaneity of the Clear Fork and Round Rock foci seems indicated. In order that this contemporaneity may be conclusively demonstrated and the chronological position of the Clear Fork Focus thereby ascertained in terms of the temporal span and age of the Round Rock Focus, it becomes necessary to refer to evidence obtained from site excavation in the Austin region.

areas of concentration and the general limits of peripheral dispersion, although it is almost certainly inaccurate in detail.

[18] Detailed study of the specific problems here involved in the excavated sites and in the distributional evidence forces the conclusion that the groups represented are nomadic food-gathering (collecting, and hunting-fishing economies) peoples whose cultural differences are the slight ones of local groups sharing a common culture. Territorial overlapping of the two local groups with associated temporary reoccupation of the same sites, together with intermittent shifting of territories, perhaps seasonally, seem to be the primary factors involved. Ethnographic data for the contact period seem to verify these provisional archaeological conclusions.

## IV. CHRONOLOGICAL POSITION AND CONTEMPORANEITY OF THE CLEAR FORK AND ROUND ROCK FOCI

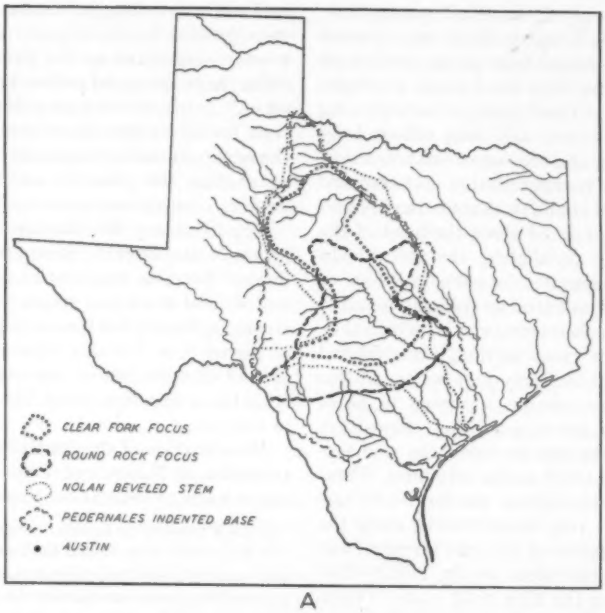
Among the numerous archaeological sites excavated between 1938 and 1942 by the Department of Anthropology of The University of Texas are the Rob Roy, Heffington, Sandy Creek, Round Rock (Round Mountain), and Grelle I and II sites located on and in the lower terraces of the Colorado River, ten to forty-two miles northwest of Austin, Texas.[19] Analysis of the results of the excavations and the laboratory studies has been completed and preparation of the report for publication is well advanced. The data here presented are abstracted from the final report and only those items pertinent to the immediate questions are discussed.

In all of the sites here considered, archaeological remains, principally hearths, artifacts, burials, and general occupational debris, were examined *in situ* in alluvial deposits constituting the twenty- and forty-foot terraces of the Colorado River. Large sections of these alluvial terraces[20] were excavated to bedrock or alternatively to the point where standing water made further work impracticable. Archaeological remains were discovered throughout much of the alluvial fill, to maximum depths of thirty feet, and stratification of occupation levels was encountered in all sites.

The geological stratigraphy characteristic of all the sites is worthy of note. The forty-foot

[19] Excavation of all these sites was made possible through labor and funds supplied by the Works Progress Administration. The Round Rock, Heffington, and Grelle sites were excavated under the supervision of the writer. Various supervisors, including Wesley Bliss, Wm. A. Duffen, George R. Fox, Kalvero Oberg, and Arthur M. Woolsey participated in the excavation of the Rob Roy and Sandy Creek sites. In addition Duffen initiated excavations at the Round Rock site. The work of all of these men has contributed to the writer's own studies, as has the unstinted cooperation and aid of Dr. J. Gilbert McAllister, Director of Research, Mr. A. T. Jackson, the general project supervisor, and Mr. Alex Krieger, then director of the archaeological laboratory.

[20] The use of the term "terrace" for these alluvial deposits is perhaps questionable. Both "terraces" actually are included in the present river flood plain and are locally known as the first and second river "bottoms." Nevertheless, they represent topographically prominent and stratigraphically distinct bodies of alluvium in terrace relationship, and are so considered in this paper.

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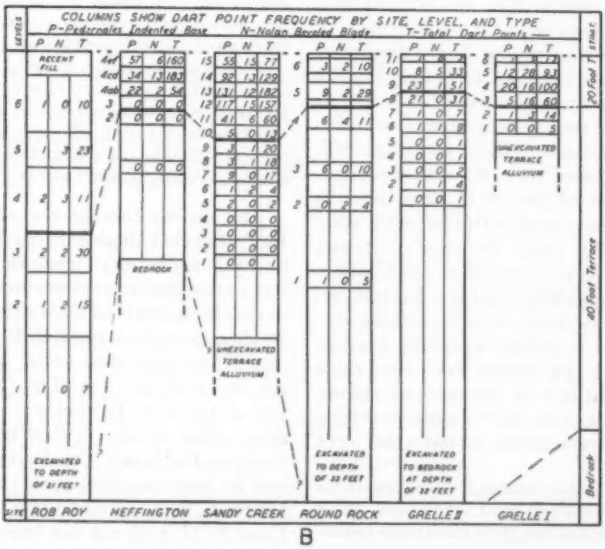


B

FIG. 9. A, Approximate territorial extent of the Clear Fork and Round Rock foci, and present known limits of distribution of Nolan Beveled Stem and Pedernales Indented Base dart point types. B, Frequency distribution of Pedernales Indented Base and Nolan Beveled Stem dart points by stratigraphic levels in excavated sites near Austin, Texas. Individual columns show the approximate depths of excavation and archaeological levels (natural or arbitrary) determined for each of six excavated sites, the Rob Roy, Heffington, Sandy Creek, Round Rock (Round Mountain), Grelle II, and Grelle I sites. Subcolumns indicate the numbers of Pedernales and Nolan points and the total number of dart points found in each level of the six sites. An approximate correlation of the geological stratigraphy of the sites is likewise indicated.

terrace is made up of stratified sands, silts, clays, and gravels, totaling thirty feet or more in average thickness and forming the great mass of sediments of the river flood plain. Its deposition was completed well prior to the beginning of the historic period, and was followed by stream channeling and erosion of unknown duration. Subsequently, aggradation was resumed and a narrow shelf of alluvium some twenty feet in thickness accumulated along the bank of the forty-foot terrace paralleling the stream. In addition, supplementary deposits two feet or more in thickness and stratigraphically equivalent to the twenty-foot terrace, with which they are continuous in cross section, accumulated over the surface of the forty-foot terrace at this time.[21] Subsequent erosion, assumed to be of very recent origin, has exposed these deposits in section and thereby has revealed the archaeological materials buried in the alluvium. These materials occur throughout the forty-foot terrace, except in its very lowest levels, along the disconformity separating the two terraces, and in the deposits equivalent to the twenty-foot terrace blanketing the high flood plain. Transported cultural debris, but no occupational levels, are found likewise in the shelf deposits of the twenty-foot terrace proper. In the discussion here presented only those artifacts found in the forty-foot terrace or in the overlying deposits equivalent to the twenty-foot terrace are considered; the transported material is ignored.

In all the excavated sites, the actual occupation levels consist of groups of small hearths outlined with stones and surrounded by scattered artifacts, flint chips, fire-cracked stones, charcoal, fragments of animal bones and broken shells, and, occasionally, human burials, all associated with one-time terrace surfaces representing temporary periods of stabilization. In all sites excepting the Round Rock site, thick midden accumulations of fire-cracked stones, artifacts, charcoal, and other debris, resulting from repeated reoccupation of the same spot without intervening accumulation of sediments, were present in the deposits at the top of the terrace equivalent to the twenty-foot terrace; often these appeared as low knolls on the flood plain.[22] Artifacts were exceedingly numerous in such locations but the complicated nature of the occupational stratigraphy made the task of untangling the identity and sequence of the various occupations almost an impossible one.

The frequency distribution of the dart point types, Nolan Beveled Stem and Pedernales Indented Base, as diagnostics of the Clear Fork and Round Rock foci respectively, is indicated stratigraphically for the various excavated sites in Figure 9, B. Detailed discussion or presentation of distribution of non-diagnostic artifacts from these sites is not possible within the limits of this paper.

Examination of the relative stratigraphic distribution of Nolan and Pedernales dart point types leads to several conclusions:

1. Both types occur together consistently in all sites.
2. In Level 2 of the Round Rock site only Nolan occurs, and in Level 3 only Pedernales appears. This is the closest approach in the excavated sites to the appearance of "pure" components. The number of specimens in both levels is very small, however, and the apparent distinction may be the result of using an insufficient sample.
3. Nolan and Pedernales occur throughout the deposits, from deep in the forty-foot terrace to the surface of the deposits equivalent to the twenty-foot terrace.
4. Pedernales is the leading type in all sites but Nolan becomes relatively and absolutely more abundant in the northwestern sites (Grelle I and II).

The distribution in the excavated sites of Baird Beveled Blade and Taylor Thinned Base dart points presents a somewhat similar picture, but so few specimens were found that their use as determinants is of little value. Baird Beveled Blade appeared at the Rob Roy site in Levels 1 and 2 (one specimen each), at the Heffington site in Levels 4c (2) and 4d (2), at the Grelle I site in Level 1 (1), and was not found in the other sites at all. Taylor Thinned Base was found at the Sandy Creek site in Levels 11, 12, and 14 (one specimen each); in Grelle I site in Levels 2 (1), 4 (3), and 5 (1); in Grelle II site in Level 9 (1); and was not found elsewhere. Few

[21] The explanation of this situation is to be found in the interesting cyclic flooding pattern of the Colorado River. Annually, at least one flood covers the twenty-foot terrace, contributing a varying increment of sediments to its bulk and height. At intervals of about eleven to thirteen years exceedingly high floods cover both the twenty-foot and the forty-foot terraces, again adding an unknown increment of sediments. Thus, the forty-foot terrace is technically still part of the flood plain and has continued to aggrade, although at a much slower rate, during the development of the twenty-foot terrace.

[22] In a preliminary paper, T. N. Campbell and the writer have discussed the factors involved in the formation of these "burnt rock mounds" and have pointed out that they do not represent deliberate constructions and hence should not be considered a cultural trait (Kelley and Campbell, 1942). The construction of stone-lined hearths, however, is a trait of both the Clear Fork and Round Rock foci.

gouges were found; their general distribution is similar to that of Baird and Taylor dart points. The other traits of the Clear Fork Focus, knives discs, gravers, spokeshaves, awls, side scrapers, hand axes, and abrading stones, were found in all sites and in most instances in relatively large numbers, which is not surprising since they are also traits of the Round Rock Focus.[23]

In view of the data presented above, it seems certain that the Round Rock and Clear Fork foci, if indeed they can be established as separate cultural manifestations, existed contemporaneously in the Austin region throughout the span of time represented by the forty- and twenty-foot terraces of the Colorado River. The age of these deposits should, therefore, determine the age of the Clear Fork Focus, as well as that of the Round Rock Focus.

The problem of early dates for these foci is that of the age of their older components included in the forty-foot terrace. Dating these older deposits is difficult. A few facts are apparent: (1) Only modern fauna has been found in the forty-foot terrace, principally *Bison bison*. (2) A considerable period of time, certainly to be reckoned in centuries, probably in thousands of years, must have been required for the aggradation of the Colorado River flood plain to the height of the forty-foot terrace surface. The age of these older deposits would therefore seem to be Recent, but a considerable part of that period may be represented and the beginning date of the foci in question may be respectably ancient (*Infra*, pp.105–7).

## V. SURVIVAL OF CLEAR FORK AND ROUND ROCK FOCI INTO THE LATE PREHISTORIC PERIOD; CONTEMPORANEITY WITH THE POTTERY HORIZON

A late horizon of culture, characterized primarily by the use of pottery and small arrowpoints, has been established for most of the state of Texas. This horizon seems to have appeared first in the extreme western and eastern portions of the state, where an agricultural economy and permanent houses are likewise associated, and to have spread in late prehistoric times to the central and southern areas. Several cultural foci have been established for this horizon, including the Toyah Focus of the central and western portions of the state, the Austin Focus of the Colorado River drainage, the Henrietta Focus of north central Texas, and the Alto and Frankston foci of eastern Texas. As yet much of the data regarding these foci remain unpublished, although this situation is materially improved by Krieger's recent paper.[24]

In the Austin region there is clear evidence that the terminal phases of the Clear Fork and Round Rock foci were contemporaneous with this late pottery horizon:

1. At the Rob Roy site, in Levels 5 and 6, artifacts of types diagnostic of the Austin Focus were found, notably, Leon Plain pottery, and Fresno Flake and Scallorn Stemmed arrowpoints. This focus has been identified as the archaeological remnant of the culture of the Tonkawa Indians, a prominent central Texas tribe of the eighteenth and early nineteenth centuries. A similar situation existed at the Round Mountain site. At this site potsherds identical with those found in the eighteenth century Spanish missions of the Goliad region, and attributed to the Austin Focus, were found *in situ* in Level 6. At both these sites, and elsewhere, the Austin Focus seems to have been contemporary with at least the final days of both the Round Rock and Clear Fork foci.

2. A somewhat earlier association was noted at the Grelle II site, where dart points of types Wells Contracting Stem and Morell Straight Stem (?) were found in the upper levels. These types are known elsewhere only from the Davis site on the Neches River, a component of the Alto Focus (*Infra*, p. 104) of the Gibson Aspect, the earliest known horizon in eastern Texas.

3. Elsewhere in the Austin region, Clear Fork-Round Rock components have been found, showing clear evidence of contact with at least the earlier phases of the Toyah Focus, identified as the archaeological remnant of the culture of the Jumano Indians, who were found in this region between 1500 and 1700 A.D.

4. There is also evidence of contact between Clear Fork-Round Rock components and the Frankston Focus of the Fulton Aspect, identified by Krieger as the protohistoric and early historic culture of the Caddoan Hasinai Indians of eastern Texas.

Certainly, then, in the Austin region, the Clear Fork and Round Rock foci were in existence as late as 1500 A.D., and they may have survived even later. In view of the great antiquity normally assigned to the Clear Fork Focus, this is indeed surprising, whatever the age of the culture's beginning. That these cultural associations are not fortuitous is indicated by

[23] Actually, gravers and spokeshaves were comparatively rare. It is thought, however, that workmen were not always properly instructed regarding such artifacts and that many such specimens were probably missed or discarded in the great masses of flint flakes and spalls processed in the field. At any rate they occur rather frequently in other excavated sites of the Round Rock Focus.

[24] Krieger, 1946.

their frequency. Furthermore, verification of the later survival of the foci in question is afforded by the appearance of Clear Fork intrusives or influence in components of the Alto and Henrietta foci.

Thus, at the Davis site, type component of the Alto Focus, in Cherokee County,[25] numerous projectile points of Balcones Phase types were found. These types included Baird Beveled Blade and Taylor Thinned Base (8 specimens each), suggesting direct contact with the Clear Fork Focus, if, indeed, these types are diagnostic of the focus as maintained by Ray.[26] Another intrusive central Texas type found at the Davis site was Bulverde Barbed (6 specimens), which was well represented at the Heffington and Grelle sites to the west. All of these types, as well as Morrell Straight Stem and Wells Contracting Stem, were stratigraphically early at the Davis site. It will be recalled that specimens of Wells Contracting Stem, and probably one specimen of Morrell Straight Stem, Alto Focus diagnostic types, were found in the upper levels of the Grelle site.[27] Also, Copena type blades or points occurred at the Davis site and have been found in Round Rock components in Coryell County.[28]

That the later phases of the Round Rock and Clear Fork foci were contemporaneous with the Alto Focus and subsequently with the Frankston Focus, as already discussed, seems certain. The Alto Focus, a Temple Mound culture, is thought to be the earliest focus of the Gibson Aspect. In 1943 Krieger estimated the age of the Gibson Aspect as *circa* 1400–1550 A.D.; however, in his most recent discussion this was revised downward and the age of the Alto Focus given as about 1100–1300 A.D.[29]

Farther to the north and west, on the Clear Fork of the Brazos River close to the putative Clear Fork Focus homeland, excavations at the Harrell site revealed an admixture of artifacts of the Balcones Phase, including Nolan Beveled Stem points, with those of the Henrietta Focus.[30] The latter focus is a South Plains culture which Krieger thinks existed from about 1450 to 1600 A.D., basing his estimate on the age of Southwestern pottery types intrusive into Red River Valley components of the focus. Here again the evidence suggests that the Clear Fork Focus was finally terminated during the late prehistoric period.

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[25] This site was excavated by Perry Newell for The University of Texas. In Newell's manuscript report, on file at Austin, the presence of Baird and Taylor dart point types at this site are noted (Newell, 1940). Identification of the other intrusive types was made by the present writer upon examination of the specimens in question.

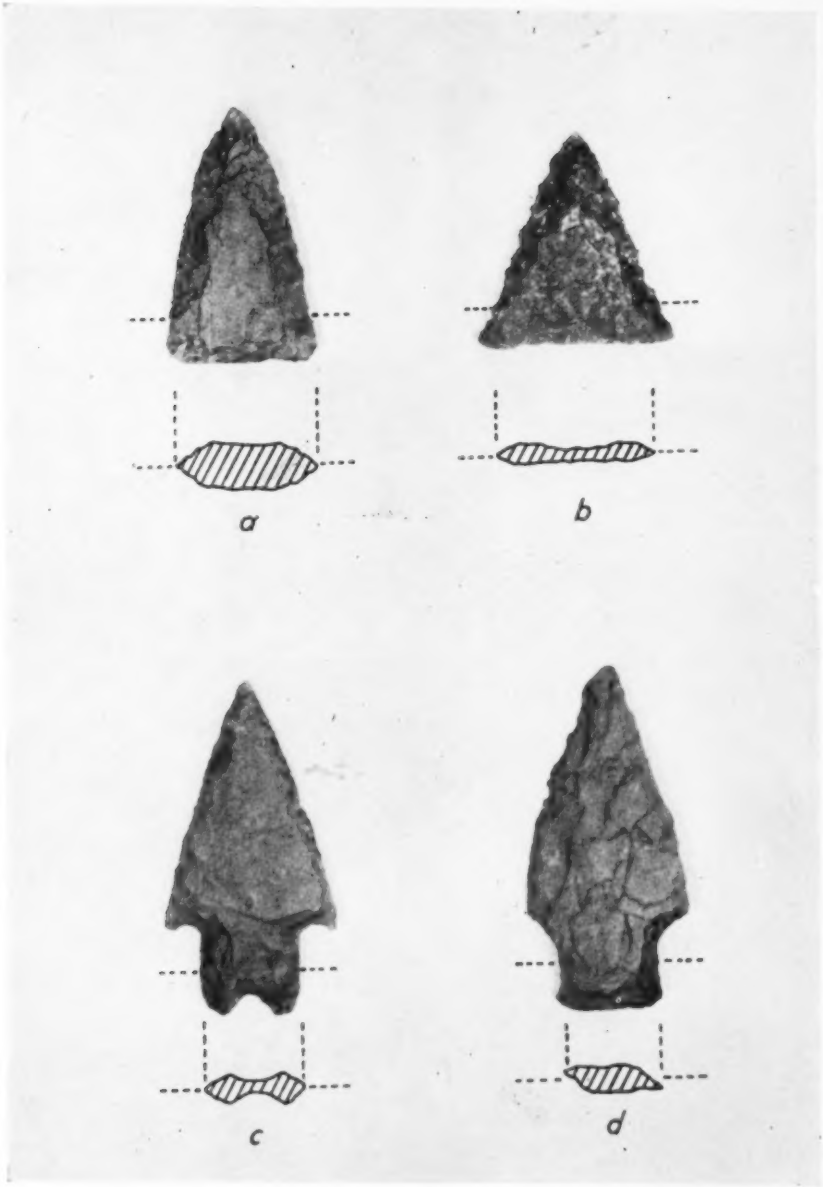
[26] It is not improbable that both Baird and Taylor will eventually be traced back to an origin in the Monte Aspect of the Balcones Phase, the archaeological culture extending from the lower Colorado River along the Gulf Coastal Plain southwestward to the Huasteca. Triangular dart points occur in great numbers in components of this aspect, and the dominant type, Tortugas Triangular Blade, is quite similar. The possibility that the triangular dart points of this culture may be traced back to a remote origin in Folsom Fluted should be borne in mind, since Folsom points showing variation toward the Tortugas mode reportedly have been found in the Brownsville region.

[27] The Grelle site may prove to be an extremely important excavation. In addition to contact with the Alto Focus indicated there, Chelf has noted the discovery of a greenstone head suggestive of southern Mexican origin at this site (Chelf, 1941). It is known that the Round Rock Focus, of which the Grelle site is a component, existed contemporaneously with the closely related Morhiss Focus to the south and with the Monte Aspect, native to much of the southwestern coastal plain. Among the dart points discovered by Ekholm in his Huastec investigations are what appear to be specimens of Garcetas Broad Stem (Ekholm, 1944, Fig. 55, C, D, E, probably A, B, and possibly X) and Bracken Broad Base (Fig. 55, F, G, and possibly H, I), which are diagnostic types of the Morhiss Focus. Furthermore, Tortugas Triangular (Fig. 55, L, M, N) and La Salle Lanceolate (Fig. 55, U, V, W) of the Monte Aspect appear to be present, and either Starr Shouldered or a somewhat similar variant of Langtry Stemmed of the Pecos River Focus, Big Bend Aspect, are likewise represented (Fig. 55, J, K). All of these types belong to Period V in the Huasteca, except Bracken Broad Base, which is assigned to Periods III and IV, and Starr Shouldered, to Periods IV and V. We thus seem to have an indirect chain of cultural contacts on a comparable time horizon stretching from the Huasteca to the Davis site. The latter site belongs to the earliest pottery horizon yet discovered in eastern Texas and is the southwestern outpost of Temple Mound culture. Krieger, furthermore, has noted curious ceramic resemblances between the Alto Focus and Huastec culture.

[28] See Webb and DeJarnette (1942, p. 37 and Pl. 29, Figs. 1–2) for description and illustrations of this type. Not only do such specimens occur in the Alto Focus, but, according to Krieger (1943, p. 154), in other foci of the Gibson Aspect as well. Certainly, they were numerous in the Gahagan Focus (see Webb and Dodd, 1939, Pl. 27, Fig. 1). In Coryell County they were found in the Rainey Creek Cave, the A. E. Hanes site, and in the Culp Collection.

[29] Krieger, 1947, Fig. 26.

[30] Campbell, 1940; Krieger, 1946. Nolan Beveled Stem was identified among the specimens from this site by the writer.




Projectile points of the Clear Fork and Round Rock Foci: *a*, Baird Beveled Blade, Clear Fork Focus (?); *b*, Taylor Thinned Base, Clear Fork Focus (?); *c*, Pedernales Indented Base, Round Rock Focus; *d*, Nolan Beveled Stem, Clear Fork Focus. (*a*, Heffington site, cat. no. 777; *b*, Grelle site, cat. no. 2740; *c*, Sandy Creek site, cat. no. 5443; *d*, Grelle site, cat. no. 91.)

Mortuary pottery from Cavers mounds, southern Manitoba: A, miniature vessel, mound no. 2; B, restored rim fragment of a small, undecorated vessel, mound no. 1. (A, cat. no. 1113, neg. no. 111; B, cat. no. 1569, neg. no. 112. Photographs by Dr. R. D. Bird, Brandon, Manitoba.)

## VI. SUPPLEMENTARY EVIDENCE REGARDING THE CHRONOLOGICAL POSITION OF THE CLEAR FORK FOCUS

Far to the west, in Val Verde County, there is evidence of Clear Fork Focus contacts on an earlier time horizon. Examination of the dart points discovered by Pearce and Jackson in Fate Bell shelter, type component of the Pecos River Focus, resulted in the identification of some fifty specimens of Nolan Beveled Stem, together with sixty-eight specimens that appear to represent a local modification of Nolan. Significantly, many Langtry Stemmed points, diagnostic of the Pecos River Focus, from this site, have their stems beveled in characteristic Nolan style. Kelley and Campbell have already presented evidence indicating the contemporaneity of Round Rock and Pecos River;[31] the new data would seem to demonstrate that all three foci were contemporaneous during at least part of their span of existence. The Pecos River Focus in the Big Bend Region is thought to have terminated around 1000–1100 A.D., certainly prior to 1300 A.D.

At this point the geologic evidence may be introduced. In the Big Bend region components of the Pecos River Focus are buried at various depths in the Calamity Formation, the intermediate of three alluvial formations of late Quaternary age. An older underlying stratum, the Neville Formation, contains extinct fauna and has been referred to the terminal Wisconsin glaciation. The younger, overlying Kokernot Formation contains components of the Bravo Valley Aspect, dated by means of intrusive Southwestern potsherds and on historical evidence at *circa* 1200–1800 A.D., as well as components of the Toyah Focus (dated *circa* 1500–1700) in its upper strata.[32] Since Toyah Focus components also are included in the upper strata of the twenty-foot terrace of the Austin region, this terrace may be correlated with the Kokernot Formation of the Big Bend region. It follows that the demonstrated contemporaneity of the Pecos River, Round Rock, and Clear Fork foci on an earlier time horizon calls for correlation of the alluvial formations in which their respective components occur; that is, the Calamity Formation of the Big Bend, the forty-foot terrace of the Austin region, and the Elm Creek Silts of the Abilene region. A similar correlation seems probable for the Neville Formation and the Durst Silts, since both occupy the primary stratigrapic position, are somewhat similar in lithological characteristics, and both contain extinct fauna as index fossils. The Durst Silts, however, have yielded Folsom points and related artifact types, while artifacts were not certainly associated with the Neville Formation. No formation assignable to this period has been identified in the Austin region.

The above correlation was advanced in part by Kelley and Campbell in 1940. Recently acquired evidence tends, without exception, to verify it. Furthermore, the Big Bend Quaternary formations have also been correlated with similar formations in Arizona and New Mexico, where additional chronological data exist. Various investigators[33] have correlated the Neville Formation with the Jeddito Formation of the Hopi country of northern Arizona, the Calamity Formation with the Tsegi Formation, and the Kokernot Formation with the Naha Formation. The Naha Formation, and by inference the Kokernot Formation, is dated on the basis of included potsherds of known age at 1300–1700 A.D. The erosional period preceding the Naha deposition is dated at *circa* 1300. The Tsegi deposition and consequently the Calamity deposition also, was completed by about 900 A.D., since houses of Pueblo II age were built on its surface. Bryan also correlated the Calamity Formation with the "Main Fill" of the Chaco Canyon, New Mexico, in which he found pottery of Basketmaker III types, indicating that this cycle of deposition must have continued until after about 500–700 A.D.[34] Hack has summarized the basis for dating the Tsegi-Calamity depositional cycle in terms of world-wide climatic fluctuations, and has advanced a tentative dating of *circa* 4000 B.C.–100 A.D., or alternatively 2000 B.C.–1000 A.D., for this depositional cycle.[35]

Applied to the Texas cultural picture this would mean that the Pecos River, Clear Fork, and Round Rock foci were in existence shortly after 4000 or 2000 B.C. and continued dominant until about 1000 A.D. At about this date the Pecos River Focus was replaced by the later cultures of the Big Bend region. In central

[31] Kelley, Campbell, and Lehmer, 1940, pp. 143–5.

[32] Albritton and Bryan, 1939; Kelley, Campbell, and Lehmer, 1940. The Toyah Focus has not yet been described in print.

[33] Albritton and Bryan, 1939; Kelley, Campbell, and Lehmer, 1940; Hack, 1942, 1945.

[34] Bryan, 1941, p. 230 and Table I.

[35] Hack, 1942, pp. 67–9 and Table II.

Texas, the Clear Fork and Round Rock foci continued in existence, probably with increasing modification, until about 1500–1600 A.D., when they too were replaced by more advanced protohistoric cultures. This general chronology seems to be in conformity with the bulk of the evidence; however, it appears that either the population of central Texas increased considerably after about 1000 A.D., or else the beginning date of the Balcones Phase is placed too early. Otherwise, it is difficult to account for the great number of artifacts that accumulated during the relatively short period of the twenty-foot terrace deposition in contrast to the comparatively small number of specimens representing the much longer preceding period.[36]

### VII. REVIEW OF THE ABILENE EVIDENCE

If the estimates given above are even approximately correct, and they are decidely favored by the evidence, then even the recent more conservative figures for the age of the Clear Fork Focus advanced by Dr. Ray and others are excessive. The Abilene evidence therefore must be reviewed.

As previously indicated, Leighton's estimates form the basis for the hitherto more or less accepted Abilene datings. But Leighton's datings were based primarily on the purported presence of extinct fauna in the Elm Creek Silts. Kelley and Campbell have challenged the validity of such associations[37] and Ray himself believes them to be erroneous.[38] Furthermore, in neither the forty-foot terrace of the Colorado River nor the Calamity Formation of the Big Bend region, correlated with the Elm Creek Silts by means of associated archaeological specimens, have any fossils of extinct fauna been discovered; the remains included are all those of modern types. These correlative depositional cycles are likewise attributed to moister climatic conditions than those now exising; nevertheless, sporadic aggradation of the Colorado River terraces in question continues under present climatic conditions. Thus, the hypothesis of an origin in the pluvial climate of the Wisconsin does not seem required to explain the deposition of the Elm Creek Silts. With these arguments Leighton's provisional chronology completely collapses and that advanced for the southwestern alluvial sequences explains the facts much more convincingly.

Estimates of great age based on depth below surface are obviously insufficient, since the rate of aggradation must be highly variable. Roberts reports sites just pre-Columbian in age that were covered by forty feet of alluvium.[39] Patination of flint specimens is equally untrustworthy, and in view of the fact that typical Clear Fork Focus specimens were certainly in use as late as the protohistoric period, the so-called "Paleolithic" typological character of the artifacts is meaningless as a means of dating. Again, the location of some sites along streams now dry is without definite chronological significance, since water is, in this region, normally available within a few miles of any site, and in addition many of the streams in question carry water seasonally.

There is other evidence from the Abilene area that requires serious consideration. Ray has found in the Durst Silts examples of another type of dart point which he calls the "Abilene Point."[40] It has been suggested that "Abilene Points" are crude variants of Nolan Beveled Stem (Clear Fork Darts 1 and 2) and may have been the earliest form of the latter.[41] Furthermore, Ray has found one Nolan Beveled Stem point ("Clear Fork Dart 2") ostensibly in the Durst Silt ("Lower Clear Fork Silt").[42] In the Gibson site, other point types, one "Gibson Point" and one "Jones Point," were found in the Durst Silt.[43] The "Gibson Point" appears to belong to the recently identified "Plainview Point" type found associated with extinct bison.[44] At the McLean site, also, two points, tentatively identified as Plainview Points by Krieger, have been found, together with one somewhat similar point, one Clovis Fluted

[36] However, the terrace surface once having become almost completely stabilized would be much more attractive for occupation than it had been during the previous cycle of active aggradation. Hence, the apparent increase in population could be explained in terms of more frequent occupation of the localities concerned.

[37] Kelley, Campbell, and Lehmer, 1940, pp. 136–8.

[38] Ray, 1945*a*, p. 132.

[39] Roberts, 1940, p. 73.

[40] Ray, 1940*b*, Plate 42, *16–18*. This article summarizes the discovery of various dart point types of the Gibson site.

[41] Kelley, Campbell, and Lehmer, 1940, p. 151; Ray, 1945*a*, p. 127.

[42] Ray, 1945*a*, *loc. cit.*

[43] Ray, 1940*b*, pp. 227–31, and Plate 42, *15*. The "Jones Point" is not illustrated.

[44] Krieger, 1947.

("long-channelled Folsomoid"), and one Oblique Yuma (?); only the latter two specimens were *in situ*.[45] Likewise, tentatively identified by Krieger as Plainview Points are two of the three dart points found by Figgins and Cook in association with extinct fauna in a putative Durst Silt exposure along Lone Wolf Creek in the Colorado River drainage of the Abilene region.[46]

Apparently, therefore, the Durst Silts not only contain extinct fauna but in addition consistently produce Folsom, Yuma, and Plainview Points, all indicative of a very early American cultural horizon. If Nolan Beveled Stem is actually associated with this formation, the beginnings of the Clear Fork Focus must go back to a rather remote antiquity; if Abilene Points are correctly regarded as variant Clear Fork Focus specimens, and if they occur in the Durst Silts as maintained by Ray, the same conclusions must be reached.

When the circumstances under which these points were found are examined closely, however, it is at once obvious that this putative association is not only questionable but rather improbable. The one Nolan Beveled Stem point reported was found at the very top of the Durst Silts and just beneath the gravel layer marking the disconformity; so were all of the Abilene Points with one exception.[47] This exception is the Abilene Point observed *in situ* at the Hodges site by Kirk Bryan. Bryan reported that this point was found actually in the Durst Silt;[48] however, Ray asserts that this specimen was in the lower Elm Creek Silts ("Upper Clear Fork Silts") and his cross section seems to verify this stratigraphic identification.[49] In the other instances it seems clear that the points in question are associated with the Durst-Elm Creek disconformity rather than with the Durst Silts. It is notable that the "Gibson" (Plainview?), Clovis, and Yuma points occur definitely within the silts and not at their surface. Thus, the age of the Clear Fork Focus may extend into the erosional period preceding deposition of the Elm Creek Silts, which would not necessarily project its beginnings much further into the past than is otherwise indicated.[50] On the other hand, if Bryan's stratigraphic identification is correct, Abilene Points must have been made as early as the terminal Wisconsin, thus presumably projecting at least the ancestral phases of the Clear Fork Focus into a late contemporaneity with Folsom-Yuma culture. This would appear to indicate a span of some 10,000 years duration for the focus, during which only minor typological changes occurred. Such a conclusion is a difficult one to accept and certainly calls for additional evidence before it can be seriously entertained.

## VIII. CONCLUSIONS

The Clear Fork Focus is a local specialization of a widespread archaic cultural pattern whose characteristic manifestations in Texas have been termed the Balcones Phase. The existence of this focus apparently came to an end only during the later prehistoric or early historic period, probably in the sixteenth or seventeenth centuries. It was certainly contemporary towards its close with the Frankston, Austin, and Toyah foci, pottery-bearing cultures identifiable with known tribes, none of which originated much prior to *circa* 1500 A.D., and all of which survived into the beginning of the eighteenth century, at least. Slightly earlier, the Clear Fork Focus was clearly in contact with the Alto Focus, a Temple Mound culture thought to have existed during the twelfth, thirteenth, and fourteenth centuries, less certainly, through intermediate foci, with Period

[45] *Ibid.*, Table 3; Bryan and Ray, 1938; Ray, 1942. Krieger tentatively identifies the points shown on Plate 32, *2* and *4*, and Plate 33, *2* and *4*, as Plainview Points. *Elephas columbi* fossils were found at this site in association with the Clovis Fluted Point.

[46] Krieger, 1947; Figgins, 1927, Fig. 1.

[47] Ray, 1940*b*, pp. 223 and 231; 1941, p. 177; 1945*a*, pp. 124–7, Pls. 21 and 22.

[48] Bryan, 1938, p. 274, Pl. 37, Figs. 2 and 3.

[49] Ray, 1945*a*, p. 128, Plate 22.

[50] This situation has been noted elsewhere. Sellards and Evans found Balcones Phase artifacts in association with Folsom points and extinct fauna in the basal gravels of the Berclair Terrace in Bee County, Texas. In the superimposed terrace silts, artifacts of the Morhiss Focus of this phase were found in association with modern fauna only. Again, the association between the Balcones Phase artifacts and the more ancient forms may be a secondary one; the stratigraphic position seems to be with the erosional period preceding the deposition of the Berclair Terrace proper rather than with an older aggradational period. (See Sellards, Evans, and Campbell, 1940. The interpretation given here is the present writer's.) In the Big Bend region, the Maravillas Complex, an early Balcones Phase culture, was associated with the same period of erosion. It looks as if the phase first took form during this period, which is presumed to have lasted for many centuries.

V of the Huasteca. Still earlier, the focus influenced appreciably the Pecos River Focus, thought to have terminated about 1000 A.D. In general, the Clear Fork Focus flourished throughout a long and favorable climatic period provisionally dated in terms of long-range geological correlations and world-wide climatic cycles at either 4000 B.C. or 2000 B.C. to 1000 A.D. It seems to have first taken form during a remote but long continued dry cycle which, theoretically, culminated about 4000 or 2000 B.C. Although a somewhat similar "complex" known almost entirely from a dart point type, the Abilene Point, may have been ancestral to the Clear Fork Focus and may itself date back to the terminal Wisconsin glaciation and a late contemporaneity with Folsom-Yuma-Plainview cultures, there is no evidence that the Clear Fork Focus as such originated prior to the Early Recent period. Previous estimates of much greater antiquity for the focus have been based on untenable assumptions and on fragmentary and often faulty evidence. Only intensive excavation in the Abilene area will completely substantiate or disprove the provisional chronology here proposed and answer the many questions yet remaining regarding the nature and extent of the Clear Fork Focus.

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# BURIAL TRAITS OF THE HEADWATERS LAKES ASPECT IN MANITOBA

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LOYD A. Wilford, in an excellent paper on the Headwaters Lakes aspect, points out that two of its important traits are primary burials, "often in a sitting position," and "small mortuary vessels . . . ."[1] Wilford's work in Minnesota has provided certain clues as to the source of the mounds in Manitoba, the traits above mentioned being among the most important.

Archaeological work in Manitoba has been exceedingly sketchy and often extremely careless. Very little if any effort has been made to correlate the various cultural horizons with known aspects south of the international boundary. Documentation is scant and unsatisfactory. Many of the mounds have been badly disturbed without regard for their scientific and historic value; and valuable material has been lost without hope of recovery. Nevertheless, examination of the early documentation, plus the work of the writer during the past few years, indicates a northwesterly movement of some of the important traits of Wilford's various Minnesota aspects.

The present paper will be confined to tracing the occurrence of the two burial traits, which Wilford believes had some connection with the historic Assiniboine. Conclusions will be avoided; there will be ample compensation if distinctions within the outer fringe of the northern mound area become slightly more apparent. There will be satisfaction if the survey that follows sheds some light on the dark problem of source, if the tabulation forges a link in the chain connecting the known and the unknown.

The first recorded "dig" into a Manitoba mound occurred on July 2, 1858. The explorer

[1] Wilford, 1945.

was H. Y. Hind and the location of the mound somewhere in the extreme southwest corner of the province (Fig. 10). Hind's half-breed guides had informed him that the numerous conical mounds near the confluence of the Antler Creek with the Souris River were the remains of a Mandan village. He writes, "We endeavoured to make an opening into one of the mounds and penetrated six feet without finding anything to indicate that the mounds were the remains of Mandan lodges."[2] Hind had been misinformed by his guides; there is evidence of a similar misconception among the Indians of the Red River settlement who believed the mounds below the settlement were the work of the Mandan.[3] In reality Hind dug, unsuccessfully, into one of the most extensive group of mounds in the province. The lack of results was probably due to insufficient work. It should be added, however, that Nickerson, working in the same area in 1913, found two mounds without trace of burials or relics.[4]

Writing from Red River on April 1, 1867, Donald Gunn gives us the first positive information. After describing how a neighbor, while digging a root cellar in a mound near the present village of Lockport, found a platform of logs "laid in a horizontal position," he adds that in the pit below the logs the farmer "uncovered a human skull, having its lower jaw attached, and lower down the vertebrae, showing that the dead had been placed in a sitting posture."[5] Bryce, working on a mound in the same area in October, 1879, describes a burial, this time under a platform of Silurian limestone, "two feet below them, and some four feet and a half from the surface of the mound an excavator struck directly on the top of a skull. The earth was carefully removed from about it and this proved to be a skeleton in an erect sitting posture."[6] The mounds discussed in this paragraph were only a short distance from the bridge across the Red River at Lockport. Immediately north of the bridge on the east bank of the river is an extensive village site which yields numerous rim sherds with cord-wrapped stick impressions, so significant in village sites of the Headwaters Lakes aspect.

During the months of July, August, and September of 1907, Montgomery made many excavations of Manitoba mounds, using the shovel, plow and team, and scraper. Most of these mounds were along the southern boundary of the province, in the area drained by the Pembina and Souris Rivers. Montgomery's methods were crude and his documentation wholly inadequate. In one of the mounds opened in the Antler Creek district he found three burial pits, in one of which "the position of the skeleton indicated that the body had been buried in a sitting or crouching position."[7]

W. B. Nickerson of the Geological Survey of Canada followed Montgomery into the Antler Creek district in 1913. He appears to have been a competent worker, but arrived too late. He left an excellent factual report which unfortunately has never been published. Nickerson doubts the statements of earlier workers, "Other explorers have reported skeletons in a seated posture, but I find that this is an inference drawn from the contracted attitude, although some of the latter might result from the falling of the body once placed in a seated position."[8] Wilford is inclined to concur with the last part of Nickerson's comment. In describing two primary burials in the Mud Lake mound he states, "The skeletons were fully flexed, with knees pointing upward, suggesting an original sitting position."[9] If Wilford's assumption is correct, then Nickerson's added comment, "The usual position is . . . on the back or partly on the left side, with legs drawn up and arms flexed,"[10] suggests that some of the mound burials he examined had originally been in a sitting position.

More recent information results from the activities of members of the Manitoba Museum Association. This group opened the Sykes Mound southwest of Hilton, Manitoba in June, 1933. Rand reports that he "found a circular grave with five skeletons in a sitting position."[11] The McKay Mound, which lies two miles west of the Sykes Mound and was excavated by Dr. D. A. Stewart of the Ninette Sanatorium, contained similar burials. Confusion enters at this point, however. There was no pottery in these two mounds, the only important relics being shell beads resembling a

[2] Hind, 1859.
[3] Bryce, 1904.
[4] Nickerson, 1914.
[5] Gunn, 1867.
[6] Bryce, 1904.
[7] Montgomery, 1908.
[8] Nickerson, 1914.
[9] Wilford, 1945.
[10] Nickerson, 1914.
[11] Rand, 1941.

common washer and small grooved shell pendants, trapezoidal in outline. Both of these are traits of the Red River aspect.[12] In 1945 the Manitoba Museum Association was again in the field, this time opening a mound near Morden, Manitoba. In a published report on the excavation Rand states, "In a pit similar to the one previously described was a skeleton buried in a sitting position."[13]

The Rock Lake mound area has revealed one burial in a sitting posture but not in a mound. One mile west of Rock Lake, on a high hill overlooking the valley of the Pembina, there was a deep circular grave with the skeleton in a sitting position. The grave did not contain any relics but the skeleton was evidently not recent. Just below the grave is a camp site with cord-impressed pottery, and the McLaren mound and earthworks are a mile distant.

This summary of the available evidence indicates that the sitting position of burial was employed in Manitoba mounds and graves from the Red River area, below Winnipeg, throughout the southern portion of the province and into the extreme southwest corner (Fig. 10).

In tracing the occurrence of small mortuary vessels in Manitoba mounds, an almost identical documentation provides the evidence. Gunn's reference is indefinite. He records, "an earthen kettle, with a shell in it."[14] There is no record of size or decoration. In view of the fact that all of the known pots from Manitoba mounds are of the small mortuary type, it is not unlikely that Gunn's kettle would fall into a similar category. Bryce found no complete pots in the Red River mound he excavated. It did contain "pieces of broken pottery . . . with the usual markings."[15] These markings were cord-wrapped stick impressions. Sherds of this kind are a common feature in mounds of the Headwaters Lakes aspect. Seven years later, in 1886, we find Bryce excavating in the Antler Creek area. The one mound he reports on contained "two pottery cups; one virtually complete, the other with a small portion broken."[16]

Montgomery's work in the Antler Creek district resulted in the finding of five "small urns," one of them associated with a burial in a sitting position.[17] Four of the vessels found by Montgomery, and the two found by Bryce, have an unusual type of decoration. This is a single spiral groove circling the pot from midbase to rim. A seventh vessel with similar decoration was excavated by David Elliott on his farm in the Antler Creek area. A reconstruction of this pot is now on exhibit in the Manitoba Museum.

Nickerson apparently did not find any small vessels or complete pots of any kind in his work at the mouth of Antler Creek. He confirms the findings of Bryce, Montgomery, and Elliott, and adds the description of an eighth vessel

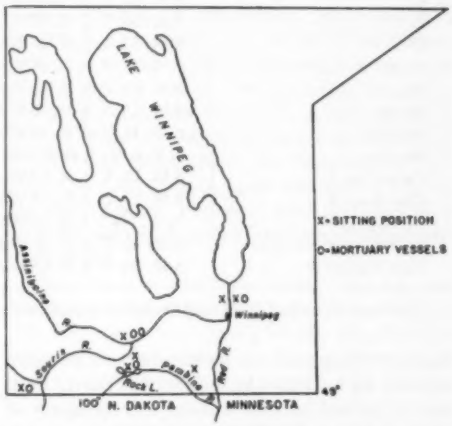


FIG. 10. Map of southern Manitoba showing location of sitting burials and mortuary vessels.

from the same area. "Another mound vessel is a little pot. . . . This vessel in decorative design is unique, not alone in this region, but in the entire north-western mound region so far as I know. Incised on all four sides are upstanding turtles, in the main identical in each repetition."[18] This pot was the property of Archie Thompson; its whereabouts is now unknown.

Further evidence of small mortuary bowls is found in the Rock Lake mound area. Near the east end of Rock Lake there are four mounds known as the Cavers mounds nos. 1–4. More than fifty years ago Douglas Cavers, the owner of the property, recovered a small pot which had been thrown out of mound no. 2 by a burrowing badger (Pl. XI, A). Additional confirmation that this group of mounds have small mortuary vessels was obtained during 1946. In April a trapper in search of a den of foxes dug a narrow but

[12] Wilford, 1941.
[13] Rand, 1945.
[14] Gunn, 1867.
[15] Bryce, 1904.
[16] Bryce, 1904.
[17] Montgomery, 1908.
[18] Nickerson, 1914.

deep hole into the heart of Cavers mound no. 1. After completing his search, the trapper refilled the hole. This episode was reported to the writer who immediately went to view the damage. The broken surface of the mound was littered with shattered fragments of human bone. The camp rubbish with which the mound was partly built was indicated in two broken side scrapers of chert and four sherds of large cooking pots, one of them being a rim with cord-wrapped stick impressions. In addition there were thirty body sherds and a number of rim sherds of a small undecorated vessel (Pl. XI, B).

Table 5. Mounds and Graves

| Name | Location | Excavator | Sitting Position | Mortuary Vessels |
|---|---|---|---|---|
| None | East side of Red River, near Lockport | Gunn | Yes | Yes? |
| None | West side of Red River, near Lockport | Bryce | Yes | No |
| C* | S.W. 33, T. 2, R. 27 Wlst | Bryce | Not stated | Yes (2) |
| C | S.W. 33, T. 2, R. 27 Wlst | Montgomery | Yes | Yes (3) |
| D | S.W. 33, T. 2, R. 27 Wlst | Montgomery | Not stated | Yes (2) |
| None | S.W. 33, T. 2, R. 27 Wlst | Elliott | Unknown | Yes (1) |
| E | S.E. 33, T. 2, R. 27 Wlst | Thompson | Unknown | Yes (1) |
| Sykes | S.W. 15, T. 6, R. 16 Wlst | Rand | Yes (5) | No |
| McKay | S.W. 17, T. 6, R. 16 Wlst | Stewart | Yes | No |
| Morden | N.E. 6, T. 3, R. 5 Wlst | Rand | Yes | No |
| Cavers no. 1 | S.W. 13, T. 3, R. 13 Wlst | Unknown | Unknown | Yes (1) |
| Cavers no. 2 | S.W. 13, T. 3, R. 13 Wlst | Cavers | Unknown | Yes (1) |
| Neelin grave | N.W. 19, T. 3, R. 14 Wlst | Vickers | Yes | No |
| Assiniboine house grave | N.E. 19, T. 8, R. 16 Wlst | Criddle | No | Metal Vessel |
| Pine Fort grave | S.W. 36, T. 8, R. 14 Wlst | Snart | No | Metal Vessel |

* The mounds named C, D, and E were so designated by Nickerson.

Wilford has pointed out that the mortuary vessels of his Headwaters Lakes aspect differ from the sherds of large cooking pots found in the mounds or used on village sites of the aspect.[19] This is also true in Manitoba. None of the small vessels described in this paper have any decorative resemblance to the utilitarian sherds sometimes found in the mounds themselves or in closely adjacent village sites.

This completes our survey of the location of small mortuary pots in Manitoba. It is significant that their geographical distribution is very similar to the location of burials in a sitting position (Fig. 10, Table 5), and there is further significance in the fact that nearby village sites yield sherds that are different, many of them bearing cord-wrapped stick impressions. It is not the purpose of this paper to suggest that the mounds under discussion are a part of the Headwaters Lakes aspect. Extensive field work, which will require funds, labor, and trained personnel, are all essential before a final decision can be reached. There appears to be, however, some indication of the westward movement through the prairies of southern Manitoba of important traits of the aspect, and these traits are scattered over an area that is known to have been the home of the historic Assiniboine from the early years of the seventeenth century to as late as 1825.

More than one anthropologist has toyed with the idea that at least some of the Manitoba mounds were the work of the early Assiniboine. Wilford's assumption that they were "most likely" to be the historic tribe responsible for his Headwaters Lakes culture, plus the chain of evidence presented here, stimulates the speculation. Wilford seeks to strengthen the connection by tracing the continuation of the two traits under discussion among the nomadic Assiniboine of the historic period. He quotes that excellent observer Alexander Henry, the elder, on both burial in a sitting position and on food offerings left at the grave.[20] There is further evidence.

Denig, a most important observer, writing seventy-five years after Henry's time and

[19] Wilford, 1945.

[20] Wilford, 1945.

speaking of the Assiniboine, states, "Bodies are never interred in a sitting posture, though that manner is sometimes observed when deposited in the lodge above ground and the posture preserved by stakes driven in around the body with forks on the end supporting the different members and equilibrium." By Denig's day the Assiniboine had adopted, very likely from the Upper Missouri cultures, the scaffold method of burial, but he adds this significant remark, "Very brave and formerly renowned warriors sometimes request not to be interred in any way, in which case they are placed inside their lodge propped up, in a sitting posture. . . ."[21]

The next comment comes from the pen of the Rev. John McLean who spent some time as a missionary among the Stonies at their reservation near Morley Alberta. "In the early days the dead were buried in a sitting posture, with face toward the east, but now they follow the custom of their white brethren."[22]

Returning to the documentation on the placing of pots in Assiniboine graves, we find the evidence less conclusive. West, writing of an Assiniboine area and describing a scaffold burial near Brandon House on the Assiniboine River, speaks of "the property of the dead, which may consist of a kettle. . . ."[23] Harmon, in a general description of the Indians east of the Rocky Mountains, among whom the Assiniboine were of vital importance and with whom he had extensive connections as a fur trader, comments as follows, "The corpse is then deposited . . . ; and along with it, a pipe and tobacco, a dish or small kettle, an awl and sinews to repair his shoes, and a sufficiency of provisions, to support him for a few days."[24] Mackenzie does not describe the burial practices of the Assiniboine. He does describe those of the Cree, a tribe profoundly influenced by Assiniboine culture. "The body is dressed in the best habiliments possessed by the deceased, or his relations, and is deposited in a grave lined with branches; some domestic utensils are placed on it, and a kind of canopy erected over it."[25]

Positive evidence by excavation that the historic Assiniboine used the sitting position in burial or interred copper kettles is lacking, mainly due to the fact that no one has yet positively identified an Assiniboine burial ground. In two cases a reasonable assumption is warranted. Close to Assiniboine House, at the confluence of the Souris and Assiniboine Rivers, and in the very heart of the Assiniboine country, Stuart Criddle of Treesbank, Manitoba has excavated four Indian graves. All of the graves contained white contact material, one of them a small copper kettle. Further down the river, just west of the old Pine Fort, a grave located by J. C. Snart contained a copper kettle which is now in the museum of the Ninette Sanitorium. The two trading posts mentioned served the area between 1768 and 1805, during which time its principal native inhabitants were the Assiniboine.

Here the case must rest. The available evidence and documentation appear to indicate that two important traits of the Headwaters Lakes aspect are present in Manitoba mounds. It is further evident that these traits are almost identical in geographical distribution. It is also evident that the mounds containing the distinctive mortuary vessels or sitting burials are either associated with, or lie in close proximity to, village sites that yield some sherds with cord-wrapped stick impressions. It is significant that the area covered by the burial traits is the known home of the historic Assiniboine, and there is some indication that these same traits were not unknown among the bands of that nomadic tribe. The problem is intriguing and its solution is essential.

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# A PRELIMINARY DEFINITION OF ARCHAEOLOGICAL AREAS AND PERIODS IN FLORIDA

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THE state of Florida is mainly a peninsula projecting some three hundred miles south of the continental North American land mass. This unique position has given the state a certain amount of isolation, as a result of which, and because of environmental factors, Florida has been able to participate in the Southeastern cultural picture and at the same time to develop characteristic local features.

Although Florida has had a long history of archaeological research, with an impressive bibliography of descriptive material, synthesis has only recently been attempted. Some early attempts were made to divide the state into archaeological areas but none were of any significance until M. W. Stirling's recent four-fold division into the Gulf Coast, Glades, St. Johns, and Northern Highland areas.[1] This division has been found, in general, to be useful, needing only greater refinement. However, stratigraphic data to give temporal perspective were lacking

FIG. 11. Map of Florida showing archaeological areas and regions.

* The research for this paper has been done under the Yale Caribbean Program directed by Dr. Cornelius Osgood. It is impossible in this short article to acknowledge my gratitude to the many institutions and individuals who have furnished me information and aid. However, I would like to thank Irving Rouse, Gordon Willey, and James B. Griffin for many helpful suggestions, comments, and for the opportunity to use their data.

[1] Stirling, 1936, pp. 354–5.

at that time. Subsequently, Gordon Willey's chronological work on the northwest coast of Florida[2] and his analysis of the Weeden Island culture[3] marked the beginning of a new period of study. The recent work of the Yale Caribbean Program was specifically directed towards the southern part of the state, but it has become apparent that an archaeological picture of the whole state is necessary in order to understand the situation in any part of it. Although a chronological and cultural framework is only now being prepared, the preliminary results can be briefly presented.

Considering archaeological Florida from the geographical aspect, we may delineate three major divisions, the Gulf Coast, the St. Johns, and the Glades. It is also possible to distinguish Central Florida, a division possibly of equal status, and the small Kissimmee region, which is not definitely placed. It will be seen that these divisions are very similar to the ones proposed by Stirling and mentioned above.

On examining the situation still more closely, the Gulf Coast can be subdivided into three areas, the Northwest Gulf Coast, the Central Gulf Coast, and the Manatee region. Within the St. Johns there are two comparable areas, the northern St. Johns and the Melbourne region.

In making this outline, chronological sequences for three areas served as the basic temporal framework: the Northwest Gulf Coast, the Northern St. Johns, and the Glades Area. The sequence from the Northwest Gulf Coast was developed by Gordon Willey,[4] and

| | LOWER MISSISSIPPI VALLEY | GULF COAST | | | GLADES AREA (4) | ST. JOHNS | |
|---|---|---|---|---|---|---|---|
| | | NORTHWEST GULF COAST (1) | CENTRAL GULF COAST (2) | MANATEE REGION (3) | | MELBOURNE REGION (6) | NORTHERN ST. JOHNS REGION (7) |
| 1700 | NATCHEZ | FORT WALTON | SAFETY HARBOR | SAFETY HARBOR | c | | |
| 1600 | | | | ? | GLADES | | |
| 1500 | PLAQUEMINE | | | ENGLEWOOD CERAMIC SERIES | b | ST. JOHNS II | ST. JOHNS II |
| 1400 | | | | | | | |
| 1300 | COLES CREEK | WEEDEN ISLAND II | WEEDEN ISLAND II | WEEDEN ISLAND II | III a | | |
| 1200 | | | | | | | |
| 1100 | TROYVILLE | WEEDEN ISLAND I | WEEDEN ISLAND I | WEEDEN ISLAND I (?) | GLADES II | ST. JOHNS I | ST. JOHNS I |
| 1000 | | | | | | | |
| 900 | MARKSVILLE | SANTA ROSA–SWIFT CREEK | PRE-WEEDEN ISLAND | PRE-WEEDEN ISLAND | GLADES I | | |
| 800 | | DEPTFORD | | | | ORANGE | TICK ISLAND |
| 700 | | | | | | | |
| 600 | TCHEFUNCTE | PRE-DEPTFORD (?) | | | | | |
| 500 | | | | | | | |
| 400 | COPELL (NON-CERAMIC) | | | | | NON-CERAMIC(?) | NON-CERAMIC |
| 300 | | | | | | | |
| 200 | | | | | | | |

FIG. 12. Areas and periods of culture in Florida.

[2] Willey and Woodbury, 1942.

[3] Willey, 1945a.

[4] Willey and Woodbury, 1942.

that for the St. Johns by James B. Griffin,[5] Vera M. Masius,[6] and Irving Rouse.[7] The third major sequence is that worked out in the Glades area by the author,[8] based in part on the work of Gordon Willey.[9] Using these three sequences for cross-checking, and with the aid of seriation, it has been possible to determine the cultures and periods present in other regions.

The accompanying map (Fig. 11) shows the individual archaeological areas and regions. The chronological sequence for each of these areas and the adjacent Lower Mississippi Valley, is shown on the chart (Fig. 12) as completely as the available knowledge permits. On the left side of this chart a series of dates is given. The more recent dates, from Troyville times on, are modified from Krieger's cross-dating of lower Mississippi Valley pottery types, as found in eastern Texas, with Southwestern Pueblo trade wares which can be dated by means of dendrochronology.[10]

## THE NORTHWEST GULF COAST

The Northwest Gulf Coast (Fig. 11:1) is a coastal strip running from Mobile Bay in Alabama to Apalachee Bay in Florida. It is not easy to delineate the exact depth of the area but the climax culture, Weeden Island, appears to extend up the Appalachicola-Chattahoochee-Flint river system for over a hundred miles into the state of Georgia.[11]

Archaeological interest in the Northwest Gulf Coast has been continuous for almost a hundred years since Schoolcraft's excellent description and illustration of Fort Walton incised pottery.[12] However, this area is most closely associated with Clarence B. Moore who in the early years of this century made repeated trips along the coast and up the rivers.[13] The most recent work is that of Willey and Woodbury who re-surveyed much of the area, making key stratigraphic excavations.[14] These revealed the presence of six periods representing five cultures. With one exception these cultures are almost exclusively known by their ceramic complexes. Chronology for this area is almost wholly based on the work of Willey and Woodbury.

*Pre-Deptford period* (?). It is possible that an early pottery-making culture existed in this region prior to Deptford times. This has been suggested by Willey and Woodbury, who found some fiber-tempered sherds in Deptford levels.[15] Such a culture presumably would be related to fiber-tempered pottery using cultures of the late Archaic. Additional fiber-tempered material from a site near St. Marks supports this possibility.[16]

*Deptford period.* The culture of the Deptford period is related to one of the same name found on the Georgia coast.[17] Knowledge concerning it is limited, but the ceramics are forms of sand-tempered pottery decorated with simple and linear check stamping.[18] Other artifacts include large triangular projectile points, pebble hammer stones, and small flat whetstones. Burial mounds do not appear to have been constructed.

*Santa Rosa-Swift Creek period.* The Santa Rosa-Swift Creek period is also one showing influence from, or connection with, Georgia. In addition, sites to the west show influence from the lower Mississippi Valley as reflected by the presence of Marksville pottery. The distinctive pottery of this period is a sand-tempered ware, Swift Creek Complicated Stamped, decorated with well executed stamping.[19] Other artifacts

[5] Griffin, J. B., 1945.
[6] Masius, 1947.
[7] Rouse, 1947.
[8] Goggin, 1947*b*.
[9] Willey, 1945*b*.
[10] Krieger, 1947. Krieger's dates for Troyville and earlier periods produce, by correlation, a too tightly compressed chronological picture in Florida. Discussion with George Quimby and James B. Griffin suggested that the early horizons of the Lower Mississippi Valley should be moved back in time, placing Tchefuncte as far back as 500 A.D. Such revision fits the Florida data somewhat more comfortably. Therefore, this dating has been used on the lower part of the chart. See Martin, Quimby, and Collier, 1947, Fig. 122.
[11] Moore, 1907*b*; Fairbanks, 1946.
[12] Schoolcraft, 1854.
[13] Moore, 1901, 1902, 1903*a*, 1907*b*, 1918.
[14] Willey and Woodbury, 1942.
[15] Willey and Woodbury, 1942, p. 252.
[16] Specimens in Yale Peabody Museum (3837). The exact location is unknown, but it should not be confused with the St. Marks site, which has produced late metal ornaments (Goggin, 1947*a*).
[17] The names for the archaeological periods on the Gulf Coast are also used for the cultural assemblages present at that time (Willey and Woodbury, 1942, p. 238).
[18] The types Deptford Bold Check Stamped, Deptford Linear Stamped, and Deptford Simple Stamped are illustrated by Willey and Woodbury (1942, Pl. 11, Fig. 1).
[19] Swift Creek Complicated Stamped is illustrated by Willey and Woodbury (1942, Fig. 27 *a*, *b*; Pl. 11, Fig. 2, *a*), as are the associated types, Marksville Stamped (Pl. 11, Fig. 2, *g*), Marksville Incised (Pl. 11, Fig. 2, *f*), and Santa Rosa Stamped (Pl. 11, Fig. 2, *h*).

differ little from those of the preceding period. The most notable introduction at this time is burial mounds containing secondary and flexed burials.[20]

*Weeden Island I period.* The Weeden Island culture is the climax of development on the Gulf Coast. It has been divided into two periods on the basis of ceramics, Weeden Island I and II. In the first, Swift Creek Complicated Stamped[21] continues to be present along with many new distinctive incised and punctated types of which the most skillfully decorated are Weeden Island Incised[22] and Weeden Island Punctated.[23] Simpler decoration is found on Carrabelle Punctated[24] and Tucker Ridge Pinched.[25] Painting also appears for the first time on Weeden Island Zoned Red.[26]

An overall study of the Weeden Island culture in all parts of Florida gives us a fairly broad picture of the many other artifacts present.[27] Celts and plummets are the most numerous of many types of stone artifacts, and trade material such as copper and sheet mica appear in some quantity. Shell objects are not abundant with the exception of cups or dippers (probably *Busycon* dippers).

Numerous conical sand mounds containing secondary burials have been the most commonly excavated sites of this culture. The interments often have substantial quantities of burial offerings and the custom of killing mortuary pottery is almost invariably indicated.

*Weeden Island II period.* The second Weeden Island period is distinguished from the first solely on the basis of ceramic change. Swift Creek Complicated Stamped dies out by this time and a new surface textured ware, Wakulla Check Stamped,[28] takes its place. This type seems to mark the resurgence of check stamping from some center, possibly the Georgia coast, whence it spread southward into the St. Johns and Glades Areas and westward into the Northwest Gulf Coast.

*Fort Walton period.* The culture in Fort Walton times represents a blend of the Floridian elements of the Weeden Island culture plus a strong Middle Mississippian influence. In terms of ceramics this resulted in a marked change in ware and decoration. Large, coarse grit replaces fine sand as a tempering material and shell is also used to some extent. Simple designs are now commonly confined to a band on the rim of the vessel and are formed by deep, broad-line incision and large punctations. Anthropomorphic and zoomorphic figures are simply represented and effigy bird head "adornos" are often applied on the rim. Fort Walton Incised,[29] which exhibits most of the above characteristics, is the most abundant decorated type while Safety Harbor Incised[30] is less common, usually appearing only in the eastern part of the area. The latter type appears in many respects to be a degenerate form of Weeden Island Incised and Weeden Island Punctated.

Little is known of other aspects of this culture. Burial mounds are less common and seem to be less important. Large flat-topped temple mounds, representing Middle Mississippian influence, occur at a number of sites.[31] Historic material appears towards the end of the period.

### CENTRAL GULF COAST

The Central Gulf Coast (Fig. 11:2) includes the coastal strip extending east and south from Apalachee Bay to the lower end of Tampa Bay. The width of this area is undetermined, but is probably not great, although certain cultures extend up some of the rivers such as the Suwanee.[32]

Archaeological work of a desultory nature has been very extensive. Walker's explorations[33] were some of the earliest and were fairly important as he showed a keen awareness of many of the problems. Later workers have produced much descriptive material; Clarence B. Moore, as might be expected, has given us the most.[34] Other important excavations include those of Frank H. Cushing at Tarpon Springs,[35] J. Walter Fewkes at the classic Weeden Island

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[20] Willey and Woodbury, 1942, pp. 252–3.

[21] See Willey and Woodbury (1942, Fig. 27, *b*; Pl. 11, Fig. 2, *e*) for late Swift Creek Complicated Stamped.

[22] Willey, 1945*a*, Fig. 15, *b*, *d*, *e*.

[23] Willey, 1945*a*, Fig. 15, *a*, *c*.

[24] Willey and Woodbury, 1942, Pl. 12, Fig. 1, *h*.

[25] Willey and Woodbury, 1942, Pl. 12, Fig. 1, *f*. Other types of the period illustrated are Carrabelle Incised (Pl. 12, Fig. 1, *h*), Indian Pass Incised (Pl. 12, Fig. 1, *d*), and Keith Incised (Pl. 12, Fig. 1, *e*).

[26] Willey and Woodbury, 1942, p. 243.

[27] Willey, 1945*a*.

[28] Willey and Woodbury, 1942, Pl. 12, Fig. 1, *c*.

[29] Willey and Woodbury, 1942, Pl. 12, Fig. 2, *a–d*.

[30] Moore, 1903*b*, Fig. 88.

[31] Willey and Woodbury, 1942, pp. 253–4.

[32] Moore, 1903*b*, pp. 364–73.

[33] Walker, 1880*a*, 1880*b*, 1883.

[34] Moore, 1903*b*.

[35] Cushing, 1897, pp. 352–4.

site on Tampa Bay,[36] and Froelich Rainey at Crystal River.[37] During the period of the Federal relief projects, excavations were made in the vicinity of Tampa Bay.[38] Some of the data resulting from this work, including that at the Thomas Mound, are described by Gordon R. Willey in a forthcoming paper.

Since no stratigraphic data are available for the Central Gulf Coast, the chronology must be determined by correlating local culture assemblages with adjacent sequences. However, much excavation is necessary in order to determine many minor but important points. A good example of this is the burial mound at Crystal River excavated by Moore,[39] which has been recently discussed by Willey and Phillips.[40] Despite an abundance of material the site cannot be satisfactorily placed in the existing cultural sequence and the strong Hopewellian relationships are not clearly understood.[41] The following sequence must be considered as only indicative of part of the archaeological picture, although its believed to indicate the dominant tradition of culture.

*Pre-Weeden Island period.* Knowledge of the culture of this period is very limited. Its existence is based on the presence of a simple premound culture reported by Fewkes[42] to underlie the Weeden Island culture at the Weeden Island site. A large bowl from this lower level[43] is said by Willey to resemble material from the Glades Area, i.e., Glades Plain pottery.[44]

*Weeden Island I period.* The presence of Weeden Island I is inferred from the occurrence of Swift Creek Complicated Stamped, the marker for this period to the north, in many sites including Weeden Island itself.[45] However, it has not been isolated in pure sites lacking check-stamped pottery which characterizes the subsequent period.

*Weeden Island II period.* Whatever the status of Weeden Island I, there is no doubt as to the presence of Weeden Island II. In general the latter is closely similar to the same culture on the Northwest Gulf Coast. Some regional differences may be noted in ceramics but no data are available for other artifacts. Weeden Island Punctated is the most abundant decorated pottery, with incised forms occurring much less frequently. In addition the typical fine grit-tempered paste is sometimes abandoned in favor of a chalky ware, probably derived from the St. Johns area. Typical Weeden Island designs occur on this paste as does check stamping (either St. Johns Check Stamped or Biscayne Check Stamped) which takes the place of Wakulla Check Stamped to some extent.

No study has yet been made of any sites in this area except burial mounds. Many large and extensive shell middens occur which may, at least in part, have been occupied by the peoples of this period.

*Safety Harbor period.* Despite the fact that the culture of the Safety Harbor period as a whole is little known, there is widespread evidence of its range and importance. The ceramics can be characterized as a crude degenerate form of Weeden Island Incised and Weeden Island Punctated modified by a strong Middle Mississippian influence, although not as strongly as Fort Walton Incised was affected. Fort Walton pottery accompanies local wares in varying amounts. The local decorated type is called Safety Harbor Incised.[46] Most sites which date from this period can be considered as being of the Safety Harbor culture but others are perhaps more typical of Fort Walton culture although the two are closely related.

Many of the non-ceramic artifacts of the Weeden Island culture continued to be used in Safety Harbor times and a number of new artifacts appeared, such as shell picks, which were apparently derived from the Glades Area. Burial mounds continued in popularity at least in the south.[47]

### MANATEE REGION

The Manatee region (Fig. 11:3) lies south of the lower end of Tampa Bay and includes the coast as far south as Charlotte Harbor. The eastward extension is uncertain but the country around Arcadia probably should be included. This area occupies a position between the Glades area and the more highly developed Central Gulf Coast, and this peripheral po-

[36] Fewkes, 1924*b*.
[37] Rainey, 1935.
[38] Simpson, 1936; Anonymous, 1939.
[39] Moore, 1903*b*, pp. 379–413; 1907*a*.
[40] Willey and Phillips, 1944.
[41] Greenman, 1938.
[42] Fewkes, 1924*b*, pp. 23–6.
[43] Fewkes, 1924*b*, Pl. 24, *c*.
[44] Willey, 1945*a*, p. 250.
[45] Fewkes, 1924*b*, p. 21.
[46] Willey and Woodbury, 1942, pp. 244–5.
[47] Cemetery sites such as Buzzard's Island (Rainey 1935) represent the Fort Walton culture in respect to method of interment as well as in pottery.

sition is clearly shown by the admixture of cultural contents in some of the sites.

Although Walker and other early archaeologists reported a number of sites in the region, little work was done in the nineteenth century.[48] Moore visited the region on two trips but found little of interest.[49] More recently excavations were conducted here as part of the Federal relief projects.[50] Montague Tallant, an amateur archaeologist of Manatee, has excavated numerous sites in the last few years.

*Pre-Weeden Island period.* Evidence for the existence of this period is not well defined, but it is quite probable that such a horizon existed. Shell mound sites containing only plain, grit-tempered pottery (Glades Plain) are reported. Such material probably equates with the Pre-Weeden Island horizon to the north and Glades I to the south.

*Weeden Island I period.* The presence of this period is postulated because of its probable presence to the north, and because the Weeden Island culture was present at some time in the region. Complicated-stamped material, occasionally reported, may belong to this horizon.

*Weeden Island II period.* Weeden Island cultural material occurs sporadically throughout the region but only one important site has come to the attention of the writer, a sand burial mound excavated by Montague Tallant on Cayo Palu, a small island in Charlotte Harbor, east of Boca Grande, near the southern boundary of the region.

*Englewood pottery series.* This series includes several types delineated by Gordon Willey on the basis of his study of the specimens from the Englewood site. The material appears to be a local development derived from the Weeden Island tradition, but it is not known whether we are dealing with only a ceramic complex or a distinct culture. On the basis of his study, Willey is of the opinion that the Englewood series in this region can be equated in time with the Safety Harbor or Fort Walton periods.[51] However, it appears that the series is even earlier, being also coeval with Weeden Island material. The basis of this is the presence of Englewood trade material in the Glades Area contemporaneous with Weeden Island material, as well as in a later horizon contemporaneous with Fort Walton or Safety Harbor material.

The Englewood series can briefly be noted as being pottery with incised and punctate decorations on either chalky or gritty wares. It is more crudely executed than Weeden Island pottery and is similar to, but distinct from, Safety Harbor Incised. Pear-shaped bottles are a unique vessel form; Stirling has called some of this material Arcadia ware.[52]

*Safety Harbor period.* This period is very strongly represented in both historic and prehistoric sites. Moore illustrates Safety Harbor and Fort Walton material from sites in the southern part of the region.[53] Numerous sites, some containing historic material are known in the vicinity of Sarasota; specimens from Pool Hammock near Laurel are in the U. S. National Museum. The cultural assemblage of this period shows numerous traits in common with the Glades Area. The bottle form is also found in Safety Harbor pottery.

### GLADES AREA

The Glades Area (Fig. 11:4) includes all of the southern tip of the state south of Boca Grande Pass on the west coast, and below Fort Pierce on the east coast. This region comprises all of tropical Florida, and the local culture reflects this environmental influence.

Archaeological interest in the area has been of long duration, dating from Jeffries Wyman's visit to the Miami River in 1870. In the following years occasional amateurs and scientists visited the region giving short accounts of certain sites. Cushing's remarkable discoveries at Key Marco stimulated much interest,[54] but Moore failed to repeat his finds although he visited many sites and made large collections of non-ceramic artifacts.[55] Subsequent workers were numerous and included, J. W. Fewkes,[56] M. W. Stirling,[57] Henry B. Collins Jr.,[58] Ales Hrdlička,[59] and many others. In the 1930's various Federal relief agencies sponsored excavations at Belle Glade and in Dade and Broward counties. This material has been recently written up by Willey.[60] The writer has

[48] Walker, 1880*a*.
[49] Moore, 1900, 1905.
[50] Stirling, 1935.
[51] Personal communication.
[52] Stirling, 1936, p. 353.
[53] Moore, 1905, Figs. 1–5.
[54] Cushing, 1897.
[55] Moore, 1900, 1905, 1907*c*.
[56] Fewkes, 1924*a*.
[57] Stirling, 1931, 1935, 1936.
[58] Collins, 1929.
[59] Hrdlička, 1922.
[60] Willey, 1945*b*.

worked intermittently on the archaeology of the area since 1933, the work after 1944 being part of the Yale Caribbean Program.[61] This included a joint excavation with Frank Sommer on Upper Matecumbe Key[62] and a comprehensive report on the whole area.[63]

The chronological sequence for the Glades Area was obtained by a correlation of sequences in the three sub-areas. These were based in the Tekesta sub-area on the stratigraphic sequence at Upper Matecumbe Key,[64] in the Calusa sub-area on the sequence at Gordon's Pass,[65] and in the Okeechobee sub-area on the Belle Glade sequence.[66] All the information available on the area has been brought together in one report which is the source for the following material.[67]

*Glades I period.* This earliest period is but little known. Its existence is based mainly on data from Gordon's Pass Midden. However, information from other sites appears to supplement this. With our present knowledge the main characteristic of the period is the presence of plain, grit-tempered pottery, Glades Plain,[68] and the absence of decorated material. Biscayne Plain pottery, a chalky ware, may also be present.

*Glades II period.* During this period we have evidence of a well-established culture with a development of ceramic decoration in two areas. The basic grit-tempered pottery is modified by incision, producing simple repeated design motifs on the east coast;[69] while on the west coast an effort was made to produce more complicated over-all designs by a combination of incised lines and dashes or ticks.[70] Belle Glade Plain is found throughout the area but in greatest quantity to the north.

Most of the distinctive tools and implements characteristic of the Glades Area as a whole can now be shown to be present. The *Busycon* and other whole shell implements apparently originated on the west coast and achieved a flourishing development there, finally reaching the east coast late in the period.

Limited evidence indicates extended primary midden burial with no grave offerings. Ceremonial development did not reach an outstanding stage. The use of personal ornaments was limited to a few forms, plain or incised bone pins being commonest. The few pendants or plummets are of the crudest and simplest forms.

*Glades III period.* This period is the climax of Glades culture, marked by extensive contact with neighboring and other Florida peoples, as well as by great internal cultural development. There appears a shift in emphasis from the decoration of ceramics to the working and ornamentation of many other materials. Incised pottery decoration dies out in all parts except the lower east coast where a very simple form, Surfside Incised,[71] is found. This pottery type is the marker for the first part of the period, Glades IIIa. The second part, Glades IIIb, is characterized by another pottery type, Glades Tooled,[72] confined except for occasional trade sherds, to the lower east coast. Period IIIc is distinguished by Glades Tooled pottery plus European material. In addition to the gritty ware pottery mentioned, large amounts of a chalky ware type, Biscayne Check Stamped,[73] carry through all three parts of the period. Many minor types and much trade pottery are present.

The other distinctive features of the period, in addition to pottery, are numerous. Various forms of ornaments were developed, shell and stone plummet pendants being common. Many objects of ceremonial nature occur, especially those of wood from Key Marco[74] and sites around Lake Okeechobee, and of metal from historic sites.

The general ceremonial development is also demonstrated by the construction of extensive earthwork and shell work sites comprising numerous platform mounds, ramps, ridges, canals, and enclosures. Interest in the dead accompanied the building activity and numer-

[61] Goggin, 1939, 1940, 1941, 1944*a*, 1944*b*.
[62] Goggin and Sommer, 1947.
[63] Goggin, 1947*b*.
[64] Goggin and Sommer, 1947.
[65] Goggin, 1940.
[66] Willey, 1945*b*.
[67] Goggin, 1947*b*.
[68] Goggin, 1947*b*.
[69] These types include Key Largo Incised (Goggin, 1944*a*, Fig. 1, *a*, *b*, *f*; 1944*b*, Fig. 1, *a–f*), Miami Incised (Goggin, 1944*a*, Fig. 1, *g–h*; 1944*b*, Fig. 1, *g*, *i*), Matecumbe Incised (Goggin, 1944*a*, Fig. 1, *c–e*; 1944*b*, Fig. 1, *h*), Dade Incised (Goggin, 1947*b*), and Opa Locka Incised (Goggin, 1947*b*).
[70] These types include Sanibel Incised (Goggin, 1944*a*, Fig. 2, *f*, *g*), Gordon's Pass Incised (Goggin, 1939, Fig. 2; 1944*a*, Fig. 2, *d*, *e*), Fort Drum Punctate (Goggin, 1944*a*, Fig. 3, *d–f*), and Fort Drum Incised (Goggin, 1947*b*).
[71] Goggin, 1944*a*, Fig. 2, *a–c*.
[72] Goggin, 1947*b*.
[73] Goggin, 1947*b*.
[74] Cushing, 1897.

ous burial mounds were now built. Burial offerings are present in small quantities but indications are that the custom they represent was a late trait which became popular in European times. The interments were usually secondary. Much of the ceremonial assemblage in terms of minor artifacts appears to be locally developed, while the more impressive features such as burial mounds and ceremonial structures were undoubtedly stimulated by contacts with the Weeden Island II, Fort Walton, and Safety Harbor peoples to the northwest.

### THE KISSIMMEE REGION

The Kissimmee region (Fig. 11:5) is a somewhat amorphous area tentatively considered, on poor evidence, to comprise the drainage of the Kissimmee River from Lake Tohopekaliga to the boundary of the Glades Area. Archaeological work has been negligible, and Moore's visit produced little information of value.[75] A. W. Conklin's description of the earthwork sites, although very limited, is probably the most illuminating paper on the area.[76] Another short paper by Kinnaman notes a site at the outlet of Lake Kissimmee.[77] Many undescribed sites are reported to exist in this region.

Little is known of the actual archaeological cultures in the region, and for that reason a chronological column is not given on the chart. A few sherds from Bassinger (*not* Fort Bassinger) near the southern boundary are Glades Plain and Belle Glade Plain, common types of the Glades Area. The only other pottery examined is a Belle Glade Plain vessel with a scratched surface from Lake Kissimmee.[78] Similar vessels, at least of the same ware and with the same surface finish but of a different form, have been found to the north near Orlando.[79]

### THE MELBOURNE REGION

The Melbourne region (Fig. 11:6) includes those parts of the Atlantic Coast and St. Johns River drainages south of Cape Canaveral and north of the Glades Area. The region occupies a peripheral position both geographically and culturally between the Northern St. Johns and the Glades Area. In the earliest times the strongest cultural affiliations were with the former region, while in later times influence was strong from both directions.

Early archaeological work was not extensive. Moore visited the area on several occasions, excavating mounds on Banana River.[80] An unusual cache of pendants from Turkey Creek, south of Melbourne, was described in another report.[81] In the following years little interest was taken in this region until the discovery at Vero of human remains and artifacts in apparent association with Pleistocene mammalian fauna.[82] A few years later another find was made at Melbourne with similar remains and under similar conditions.[83] The literature on these finds is extensive and opinions on the dating run the full gamut of possibilities. My present opinion is that these finds are probably early, that is in the recognized cultural column, but that they are not of any great antiquity. This problem is being thoroughly re-examined and evaluated in a forthcoming paper by Rouse.[84]

Recent interest in the region has been stimulated by the work of Mr. A. T. Anderson, an amateur archaeologist of Melbourne, Florida. His extensive excavations at South Indian Field, ten miles west of Malabar, came to the attention of James B. Griffin who in turn brought them to the notice of Irving Rouse. This resulted in a joint Yale Peabody Museum-University of Michigan excavation under the leadership of Dr. Rouse in the summer of 1944.

Stratigraphic excavations made by Vera M. Masius[85] and a survey of the general region made by Irving Rouse[86] have resulted in a stratigraphic sequence which is used in this paper. Further excavations in the area were made in the summer of 1946 by Hale G. Smith at the Higgs site near Sebastian Inlet. While this is thought by some to be an Indian mission site, it appears more likely to be a Spanish plantation dating from the first quarter of the eighteenth century.[87] Indian material in the site and nearby indicates a long aboriginal occupation extending into historic times.

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[75] Moore, 1905, pp. 299–302.
[76] Conklin, 1875.
[77] Kinnaman, 1912.
[78] Collected by C. B. Moore (Chicago Museum of Natural History, 49457).
[79] Milwaukee Public Museum, 50, 10350.
[80] Moore, 1922, pp. 43–7.
[81] Moore, 1898.
[82] Sellards, 1916, 1937.
[83] Gidley, 1929.
[84] Rouse, 1947.
[85] Masius, 1947.
[86] Rouse, 1947.
[87] Higgs, 1942.

*Non-ceramic period (?).* A period of non-ceramic occupation as represented in the Northern St. Johns has not yet been found. However, it is possible that the Vero and Melbourne finds may belong in part to this horizon.

*Orange period.* This is the earliest ceramic horizon, distinguished by fiber-tempered pottery of the Orange series.[88] The period is best represented along the St. Johns especially at South Indian Field,[89] but small sites on the ocean indicate a minor occupation of the littoral.[90]

In addition to the distinctive pottery, numerous steatite vessel sherds were found at South Indian Field. Other artifacts assignable to this culture include *Strombus* shell celts, chipped flint points, and polished bone ornamental pins. There seems to be the possibility that dogs were prized for food and apparently many were raised for eating.

*St. Johns I period.* The abandonment of fiber-tempered pottery seems to have taken place late in the Orange period with a carry-over of the designs to a chalky ware pottery. In St. Johns I times, this decoration dies out and St. Johns Plain,[91] a chalky ware, becomes the dominant form of ceramics. No decorated types occur but trade connections with the south, the Glades Area, are indicated by an appreciable quantity of Glades Plain and Belle Glade Plain pottery types. The only other type of artifact which can be assigned to this period is the *Busycon* gouge, but its earlier and later range is not known. It is also not known whether burial mounds were in use at this time.

There is some indication that during this period the center of population shifted from the St. Johns River Valley, in the interior, to the coast. This may be the result of, or an accompaniment of, a shift in basic subsistence from hunting to the gathering of molluscs.

*St. Johns II period.* The final major horizon in the region is characterized by the appearance of check stamping on chalky ware, St. Johns Check Stamped.[92] Burial mounds are now known with certainty for the first time.

The later part of the period runs into historic times. Our knowledge concerning the specific cultural details of the period is limited because no modern excavations have been undertaken in a prehistoric site of this horizon. The occupation seems to have been very extensive but mainly on the coast. It is during this period that the bulk of the larger shell middens along the Indian River were built up.

### THE NORTHERN ST. JOHNS REGION

The Northern St. Johns Region, which includes the lower St. Johns River Valley and adjacent Atlantic coast north of Cape Canaveral, is the area with the longest history of human occupation in Florida (Fig. 11:7). In addition it is a region exhibiting many exotic cultural features which are difficult to place in their proper perspective at the present time.

Aboriginal remains along the St. Johns were some of the most impressive in eastern United States with elaborate earth structures and large shell middens which stood twenty odd feet above the marshy banks of the river. It is only natural, therefore, that they attracted the attention of travelers at an early date. Bartram's colorful descriptions of sites are still interesting.[93] However, the modern period of interest begins after the War Between the States when numerous northern tourists (the first of their kind) began to make steamboat trips up the St. Johns River. Many notices are available from this period, but the work of Jeffries Wyman, culminating in his final posthumous report, is most significant.[94] In subsequent years other workers gave brief contributions to the archaeology.[95] Clarence B. Moore began his intensive work here in 1892 and continued for a number of seasons, covering the whole St. Johns. His contributions on the archaeology of this region are perhaps the most significant of all his work.

In the years following Moore's work there was little interest in the St. Johns, perhaps because the feeling existed that the possibilities had been exhausted. Attention now shifted to the Atlantic Coast where Mayberry[96] and Douglass[97] had previously noted sites. Douglass' work was perhaps the most thorough of any on the east coast for many years. The newer

[88] Griffin, J. B., 1945, Fig. 1, *a–c, j–r.*
[89] Masius, 1947; Rouse, 1947.
[90] Rouse, 1947.
[91] Masius, 1947; Rouse, 1947.
[92] Nelson, 1918, Fig. 7; Masius, 1947; Rouse, 1947.
[93] Bartram, 1791.
[94] Wyman, 1875.
[95] Lente, 1877; Calkins, 1878; Dall, 1885; Hale, 1887.
[96] Mayberry, 1878.
[97] Douglass, 1885.

writers like Webb,[98] Brower,[99] and Butler[100] contented themselves with descriptive data on sites, but others such as Gleck noted stratigraphic variants in pottery.[101] It remained, however, for N. C. Nelson to point out in careful detail the stratigraphic ceramic sequence at Oak Hill.[102] Certain other particulars aroused interest in this general period, for instance the finding of extinct auk bones in a shell midden near Ormond.[103]

The recent period of archaeological research is distinguished by excavations carried out under Federal relief programs in the 1930's. Those at Ormond Beach and Cape Canaveral have been briefly discussed by Stirling.[104] F. W. Sleight reports a recent test dig on a shell mound five miles northwest of Geneva, but no details are given.[105]

The rather large amount of data available for a student of this region is overwhelming in its variety. There were local efflorescences which produced the "freak" mortuary pottery of the St. Johns; in addition the region exhibits the impacts of many surrounding cultural influences. This is shown by the Middle Mississippi traits and the Georgia complicated stamped and cord-marked pottery extending southward along the coast; Griffin even infers Hopewellian influences.[106] At present it is impossible to give a clear archaeological picture of the region, although we can present a general outline, derived mainly from stratigraphic sequences in middens without consideration of the complex burial mound remains. The sequence is a synthesis of the data of Wyman, Moore, and Nelson, plus inferences derived from the Melbourne region. [107] It is almost identical with the Melbourne sequence but it should be remembered that the Melbourne sequence probably shows, fairly well, the actual situation, while this one does not illustrate the complexities.

*Non-ceramic horizon.* The existence of a pre-pottery culture in the St. Johns is well demonstrated by Wyman and Moore. This must have been a long intensive occupation for very large shell middens can be ascribed to the horizon. However, beyond its existence and the absence of pottery, little is known of the culture as a whole. Moore notes arrowheads in this horizon, but nothing else, and he specifically denies the presence of ornaments.[108]

The bulk of the occupation at this time is believed to have been on the St. Johns River, but Nelson reports a pre-pottery level on the coast at Oak Hill.[109] It has not been noted elsewhere on the coast.

*Tick Island period.* This is a fiber-tempered pottery horizon, the northern counterpart of the Orange period. As with the previous period, little is known of the total culture. The pottery, well represented in a number of collections, is a thick fiber-tempered ware, both plain and incised.[110] Chipped stone is present and midden burials are occasionally found, but other cultural data are lacking. Occupation is mainly along the St. Johns and tributary streams, but one possible site is reported on the Halifax River on the coast.[111]

*St. Johns I period.* The replacement of fiber-tempered pottery and incised decoration by a chalky ware, St. Johns Plain, is characteristic of this horizon. There is every reason to believe that some of the many burial mounds of the region were constructed at this time. Two cultural units isolated by Griffin,[112] Racey Point and Murphy Island, fall within the general time horizon of this period, but the few stamped sherds noted by Moore[113] at the first site suggests that a critical examination of that cultural unit is necessary. Vessels, undecorated save for red paint, occur in some quantity at certain sites and may represent another cultural unit assignable to the period. Another tentative unit dating from the latter part of this period would include the low mounds south of Grant mound, and the Alicia mounds notable for their abundance of late Swift Creek Complicated Stamped pottery.[114]

[98] Webb, 1894.
[99] Brower, 1906.
[100] Butler, 1917.
[101] Gleck, 1894.
[102] Nelson, 1918.
[103] Hitchcock, 1902.
[104] Stirling, 1935, pp. 385–9.
[105] Sleight, 1943, p. 382.
[106] Griffin, J. B., 1946.
[107] Wyman, 1875; Moore, 1894; Nelson, 1918.
[108] Moore, 1894, p. 210.
[109] Nelson, 1918.
[110] Griffin, J. B., 1945, Fig. 1, *d–i*.
[111] Personal communication, John W. Griffin.
[112] Griffin, J. B., 1946, Fig. 2.
[113] Moore, 1894, p. 182.
[114] Moore, 1895.

*St. Johns II period.* This was a long horizon tentatively marked by the introduction of check stamped pottery.[115] As with the other periods of the region, cultural details are lacking. It is probable that there were numerous cultural units which have yet to be distinguished. Middle Mississippian influences were strong in some sites such as Mount Royal, where numerous artifacts attributed to the Southern or Buzzard Cult have been found.

Occupation was extensive on both the interior and coast, but it is most noticeable in the latter region where St. Johns Check Stamped pottery is abundant in large shell heaps.

## CENTRAL FLORIDA

Central Florida (Fig. 11:8 )is not a clear-cut cultural area, but rather is the portion of the state remaining after the other regions have been delineated on all sides. In general our knowledge is scanty, but the limited information indicates that at some times, at least part of the region was culturally distinct. Early historical accounts testify to a large aboriginal population in the sixteenth century. Available data fall into two groups, a northern and southern, and for that reason we will consider each in turn without any implication of geographical or cultural importance other than convenience. Information is not available to form a chronological column for this region, so none is presented on the chart.

*Southern section.* Archaeological work in this section has been done around Lakes Butler and Apoka to the west of Orlando. Some early excavations were made by Featherstonhaugh, but his data are scanty.[116] He found historic material among other things. In 1932, Joffre L. Coe made a small test excavation in a low sand burial mound on the west side of Lake Apoka. Artifacts found included a few sherds, all grit-tempered, with one marked with check stamping and another with simple stamping.[117]

The most fruitful source of information is a good sized collection made in this section by Adolph Meinecke.[118] It includes abundant Weeden Island material, Englewood series pottery, and many historic objects, indicating a good range of occupation with much influence from the west coast. It may be that further data will show the section to be merely an eastward extension of the Central Gulf Coast region. Glades Area or Kissimmee region influence is shown by two vessels of Belle Glade Plain ware with scratched surfaces.

*Northern section.* In this section, too, information is scanty but much undescribed material is in the Florida State Museum. The center of available knowledge is roughly Gainesville, and while there is no large amount of material available from any one site, a long range of occupation is indicated.

Suggestions of an early occupation have been made by A.E. Jenks who reports beveled artifacts of bone and ivory in Columbia County.[119] A middle period of occupation is probably represented by the two mounds near Gainesville excavated by the Bureau of American Ethnology.[120]

Henry Gillman excavated sites in the vicinity of Santa Fe Lake. One sand mound may have contained Weeden Island material, to judge from his description of sherds with "indented patterns." An outstanding characteristic of the site is the presence of cremation with two human crania filled with burnt bones.[121] Another mound, undoubtedly historic, contained a Spanish olive jar.[122]

Sherd collections made by the writer in the vicinity of Paynes (Alachua) Prairie, south of Gainesville, contain a good proportion of grit-tempered, cob-stippled pottery.[123] It is possible that this may pertain to the eighteenth century Seminole occupation in the vicinity.

## CONCLUSIONS

This survey of the archaeological picture of Florida, although brief and in places sketchy, indicates that the problem may be attacked from a combined geographical, cultural, and temporal point of view. It appears probable that there were three cultural hearths in Florida which served as the main centers of development. These are the Northern St. Johns, possibly the oldest, the Northwest Gulf Coast, only somewhat younger, and the Glades Area. In the case of the first two areas, it is probable that,

[115] St. Johns Check Stamped, Nelson, 1918.

[116] Featherstonhaugh, 1899.

[117] Personal communication, Joffre L. Coe, January 3, 1947.

[118] Milwaukee Public Museum.

[119] Jenks and Simpson, 1941.

[120] Thomas, 1894, pp. 327–9.

[121] Gillman, 1878.

[122] Gillman, 1879.

[123] Specimens in the Ceramic Repository for the Eastern United States, University Museums, Ann Arbor.

after the initial cultural development, the distinctive features spread, wholly or in part, to surrounding regions forming larger areas, much of whose cultural background may be derived from the first hearth, The development in the Glades Area was confined more to its original hearth, although certain influences did spread beyond its limits.

Florida's peripheral position by no means excluded it from the broader aspects of the general Southeastern prehistoric picture. Certain widespread cultural phenomena such as the early use of grit-tempered pottery and the general late distribution of check stamped pottery, which marks the beginning of Weeden Island II, St. Johns II, and Glades III periods, have counterparts outside the state. Broader cultural configurations, such as the "Middle Mississippian," may readily be detected in Florida and special phases, such as the Buzzard or Southern Cult traits, can also be easily seen.[124]

However, all foreign influences in Florida cannot be simply equated with their counterparts. For example, Greenman[125] and Griffin[126] have noted Hopewellian resemblances on the St. Johns, especially at Crystal River. Both Griffin[127] and Quimby[128] have equated the Crystal River culture with the latter part of the midwestern Hopewellian, coeval with Weeden Island I in Florida. While this may appear to be the logical position of the Crystal River culture to those workers looking at Florida from the north, it does not appear to fit the local details.

The most intensive study of Crystal River was made by Willey and Phillips,[129] who placed the part studied in late Weeden Island times (Weeden Island II). Moore's[130] data, as interpreted by Willey and Phillips leave no other feasible alternative, unless much of the chronological sequence now in use is in error. In addition, Crystal River has a greater number of specific similarities in traits with the Glades Area than does any other culture in Florida. Many of these shared traits do not appear in southern Florida until Glades III times, which is the equivalent of Weeden Island II and Fort Walton. Thus, ties to the south support the date of Willey and Phillips.

Difficulties of this sort, which may be due to Florida's marginal position, will certainly increase with more data. Nevertheless, foreign influences, both in ceramics and broader aspects, may well prove to be important temporal and cultural factors in determining the relationships of many Floridian cultures, both to each other and with other Southeastern cultures.

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AAnn *American Antiquarian*. Chicago.
ANS-J *Journal of the Academy of Natural Sciences*. Philadelphia.
SI-AR *Annual Report, Smithsonian Institution*. Washington.
SI-EFW *Explorations and Field Work, Smithsonian Institution*. Washington.

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# ARCHAEOLOGICAL THEORY AND ANTHROPOLOGICAL FACT

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AS W. H. Holmes pointed out in 1905, our archaeological investigations need to be "supplemented by the rich materials derived from the study of the living peoples."[1] In accordance with this line of thought, I have tried to correlate some findings of archaeology and ethnology in relation to the small but controversial archaeological problem of fetishes and toys.

The clay figurines and miniature pots illustrated in Plate XII were made as toys by contemporary Navaho children living in the region between the Chaco and Blanco Canyons, New Mexico.[2] The toys represent two women with the characteristic Navaho skirts and headdresses, three miniature vessels (a handled mug, round-bottomed cooking vessel, and crude dish), and thirteen animals, including two dogs, a sheep, ram, mare, donkey, two horses, a cow, chicken, buck, and two goats. The faces of the women have been pinched to suggest a nose but otherwise they are featureless. One dog, the sheep, cow, two horses, and one of the goats have black glass beads for eyes. Both horses have black yarn manes and tails. They also have punctate nostrils, as has the dog with the bead eyes. The mare (Pl. XII, *center*) and donkey (Pl. XII, *right foreground*) have pinched-up manes. The animals are approximately six to nine centimeters in length. They were made by two girls, ten and twelve years old, and two boys, eight and nine.[3]

Drs. J. O. Brew and Emil W. Haury report seeing Navaho children playing with similar toys near Awatovi.[4] The children whisked the toys out of sight when they found they were being observed. However, Dr. Haury obtained a picture of the toys (Pl. XIII) and points out the fact that the children had made clay saddles.

It is twenty years since J. Walter Fewkes first recorded similar toys and launched or rekindled the toy-fetish controversy.[5] His are reported as being "remarkably similar to images found in excavations on prehistoric American sites and which up to this time were thought to be fetishes."[6] Fewkes' figurines were made by a Navaho child four years old and include a sheep, goat, horse, cat, dog, women, babies, one man, and a doll carriage. The women have punctate necklaces and the modeling suggests the blankets they are wearing but makes no attempt to delineate facial features.

To my knowledge, no Navaho figurines are illustrated in the literature since Fewkes[7] although they are mentioned by Hill:

> Pipes, dolls, and animal figures also were made of clay. The latter two were generally sun dried, and were given to the children for toys.[8]

And Tschopik writes that figurines are no longer made in Ramah, although they used to make them:

> Crude effigies, *haɬXiɬ da·nę?é*, "mud playthings," were manufactured formerly. These represented animals (horses, sheep, and goats), men and women, and miniature cups and dishes . . . . These were made by the women for their children to play with; according to informant 15, these toys were often modeled by the children themselves. A few incised lines served to indicate the facial features, although the figurines were never painted. These toys were either fired (15, 36) or were left in an unfired condition (192) . . . .[9]

Tschopik footnotes that Gifford's western informant reported effigy figures, principally birds. His eastern informant said figurines were

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* With apologies to William Duncan Strong, "Anthropological Theory and Archaeological Fact," 1936, p. 359. The author wishes, also, to express appreciation for consultations with Drs. Clyde Kluckhohn, John O. Brew, Douglas S. Byers; to the last for kindness in taking the photograph of the Navaho figurines, Plate XII; and to Dr. Emil W. Haury for his kindness in letting the author use his photograph of Navaho toys, Plate XIII.

[1] Holmes, 1905, p. 558.

[2] Obtained during ethnological field work at the Field School of the University of New Mexico, Chaco Canyon, New Mexico, 1941.

[3] The names of the animals are those designated by the children who made them. In answer to queries as to children's toys, several other different informants volunteered the fact that children made animals out of adobe mud for playthings.

[4] Personal communication from both Dr. Brew and Dr. Haury. Dr. Haury also mentions the fact that wooden toy horses are frequently seen.

[5] Fewkes, 1923, pp. 559–63.

[6] *El Palacio*, 1923, p. 165.

[7] Fewkes, 1923, pp. 559–63.

[8] Hill, 1937, p. 10.

[9] Tschopik, 1941, p. 13.

Clay figurines and miniature pots made by contemporary Navaho children. *Left to right:* two Navaho women; three miniature vessels (*front to back:* handled mug, crude dish, round-bottomed cooking vessel); four animals (*front to back:* dog, dog, sheep, buck); three animals (*front to back:* mare, cow, chicken); three animals (*front to back:* donkey, horse, horse); three animals (*front to back:* ram, goat, goat).

Contemporary Navaho clay animals (photographed by Emil W. Haury).

not made. Mr. Richard Van Valkenburg, according to Tschopik, writes that the Navaho of the Little Colorado River region also make figurines "representing such subjects as buffalo, mountain sheep, horses, antelope and deer."[10]

Navaho *mush* figurine offerings are not to be confused with the *clay* objects under discussion.[11] The only known Navaho ceremonial objects made of unbaked clay are the mud vaginas.[12]

In combing the Navaho bibliography, I discovered an illustration of a "Sand Table Reproduction of Navajo Life," made at the Leupp School in Grade Four, which shows animals which appear to be very similar to the ones from Chaco.[13] It shows some of the animals in a corral made of little sticks. My informant had said, "Children always go out and get adobe mud and make up an animal—a horse or sheep—and make a little corral with sticks and corral them."

In themselves the Navaho toys do not present serious problems; they are a straightforward "anthropological fact." However, A. V. Kidder's finding of burned clay "ridge-necked animal effigies" at Pecos with "pinched-up" manes similar to the mare and donkey in Plate XII provokes thought.[14] Kidder writes:

> *Occurrence of effigies at Pecos.* The clay effigies, whether of human beings, quadrupeds, or birds, all came from the refuse. None occurred in caches, nor is there a single record of an effigy which surely formed part of the furniture of a grave. Their stratigraphic position is pretty clearly established in Glaze V, for they are apparently absent from earlier strata and the very few which came to light in later rubbish may well have been accidental inclusions. The Glaze V period seems to have opened about the middle of the 16th century and to have closed about the middle of the 17th; it is therefore safe to estimate that these little objects enjoyed a vogue of not much more than a hundred years. *I am at a loss to understand their cultural significance.* Effigies of any sort were exceedingly rare in the Southwest subsequent to Basket Maker III and nothing closely similar to the Pecos human figurines has been reported from any Southwestern horizon, early or late. Even in ruins of the Galisteo Basin, only a few miles to the west, which were inhabited during the 16th and 17th centuries, no specimens, Mr. Nelson informs me, have appeared. Their manufacture looks, therefore, to have been a purely local development. I have sometimes wondered if it might not have been inspired by Mexican Indians accompanying the Coronado expedition of 1540–1542, some of whom remained at Pecos. *But the specimens fail to resemble any known Mexican type. Their use is equally a mystery.* The human representations, particularly the flat-bodied ones, are so highly standardized and so unrealistic that they give one the impression of cult objects. Yet *the fact that they*, as well as the animals and birds, *were battered and bruised and ultimately cast on the middens, argues against their having been held in special reverence. They may*, of course, *have been mere toys; or*, perhaps even more probably, *they may have played a brief ceremonial role and then been given to the children for playthings*, as is done today by the Hopi with their carved wooden *katchinas*.[15]

Here we face "archaeological theory." It is inevitable that much archaeological material must be interpreted by weighing one probability against another. Dr. Kidder has done his part by scrupulously recording the exact location of the finds. Even to hope for an intelligent guess as to use and cultural connotations requires more than archaeological theorizing. Historical evidence and all known examples of similar contemporary material must be carefully examined before a guess can be weighted with some measure of validity.

At first glance, it might appear that Dr. Kidder's suggestion as to toys is correct. The Navaho objects which are known to be toys are similar to those at Pecos. However, the problem is complex and there are many other factors to be taken into consideration, not the least of which is that the Pecos finds are *Pueblo* rather than Navaho. Certainly a comparative study of Pueblo and Navaho artifacts and customs is indicated before a final stand on the question can be safely taken.

As Dorothy Keur so wisely warned in interpreting Navaho archaeological material:

> The fact that Navaho ceremonialism is so largely nonmaterial in its expression, however, is a warning against too glibly assigning objects of unknown use to the category "ceremonial."[16]

[10] *Ibid.*, footnote 27.

[11] Kluckhohn and Wyman, 1940, pp. 30–1. *"Mush Figurine Offerings:* Kluckhohn has seen mush figurine offerings modeled from a special sort of corn meal mixed into a dough with wild cherry bark in an excerpt from Mountain Top Way, Female Branch. These are made representing porcupines, snakes, bears, coyotes, or other dead animals which a pregnant woman or her husband has looked on in order to prevent injury to the baby. Apparently they are not made in full five- or nine-night chants."

[12] Haile, 1938, pp. 54 and 241–2.

[13] *Indians at Work*, 1935, p. 8.

[14] Kidder, 1932, pp. 128–9. Illustrations of figurines which are on exhibit at the Robert S. Peabody Foundation for Archaeology, Phillips Academy, Andover, Mass.

[15] *Ibid.*, p. 133. The italics are mine except for Kidder's italicizing of the last word, "katchinas."

[16] Keur, 1941, p. 63.

Contemporary Navaho clay animals (photographed by Emil W. Haury).

Likewise, we might add that Pueblo ceremonialism is so replete with material evidence that we cannot too glibly assign objects of unknown use to the category of "toys." Also the well-known fact, noted by Dr. Kidder, that even the Hopi children's dolls were first katchinas, makes us especially cautious.

Recent ethnographic evidence from the Keresan pueblo of Tamaya, or Santa Ana, emphasizes this. Leslie A. White illustrates clay figures of animals which, while not identical to those from the Navaho, are very similar.[17] He writes:

> The Christmas ceremonies and festivities begin on Christmas eve and end on the evening of December 28th. Fiscale Mayor opens the church on Christmas eve. The sacristan brings out a small image of Jesus, about eight inches long, and displays it on the platform in front of the church altar. Shortly before midnight Fiscale goes through the pueblo announcing that the hour of Christ's birth is almost at hand. *The people—men, women and children; anyone who so desires—bring little unbaked clay images of domestic and game animals and images of corn, melons, etc., to the church and place them in front of the altar.* They put cotton on the backs of the animal images "to keep them warm," and place bread and lighted candles in front of them. These clay images are left here until the 28th. The purpose of the ritual is, of course, to secure the ianyi (power and blessing) of Jesus to multiply the game and to increase their herds and crops.[18]

Elsie Clews Parsons notes many instances of the Pueblo ceremonial use of clay figurines. She writes:

> . . . The Keresan townspeople are represented collectively by clay images. The Town chief takes care of his people by looking after their figurines, "his children" (San Felipe, Santo Domingo).[19]

She sheds definite light on the Pecos problem in the following passage:

> Hopi figurines of domestic animals made for the increase of the animals are set out on winter solstice altars together with seed corn and meal images of peaches and melons. On the corresponding night at Zuni, which is also the night before the Saint lies in, the animal figurines are set around the Saint or, in a Rain chief's house, set on the altar. At Laguna on Christmas Eve the figurines are taken to the church, and at Acoma on the Saint's day, they are set on the altar erected outdoors, and after the altar ritual they are buried or immured in the sheep, cattle, or horse corral. The Zuni figurines of the Rain society altar are placed in an underground shrine[20] in the chief's house. *Inferably the animal figurines, many with punctuate designs, found at Hawikuh, in the Canyon de Chelly, and at Pecos, were prayer-images.*[21]

And Parsons says:

> As animal figurines are made for increase, so are human figurines or dolls, "babies." A clay "baby" may be placed upon a Zuni Rain chief's winter solstice altar by a woman desirous of offspring.[22]

Fewkes also notes the use of figurines in Pueblo rites, especially at the winter solstice.[23] Elsewhere he writes:

> In almost every Hopi sheep corral there is a place where clay images of the animals are placed as prayers for the increase of domestic animals.[24]

We may agree that White's, Parsons', and Fewkes' contemporary data seem to suggest the possible ceremonial use of clay figurines found in a Pueblo site. However, current ethnographic evidence cannot automatically be transposed to apply to archaeological material unless the location and associations of the excavated items corroborate the present custom. Kidder's exact location of the battered figurines in the refuse dumps[25] casts doubt on the ceremonial explanation as applied to Pecos until we read Parsons' detailed description of the "Itiwana at Zuni." Here the women made the clay images and they were set out at night as rites of fertility magic.

> The clay objects are later buried in the floor of the house, or *thrown out on the twentieth day with the sweepings.* They are the seed from which the real objects will grow.[26]

This may explain the location of Kidder's excavated figurines.

Also we note that Kidder reports figurines only in Glaze V times at Pecos and they are now a common Pueblo practice. Parsons has a splendid article, written in 1919, in which she brings together illustrations of both contemporary and excavated Pueblo figurines.[27] In the light of Kidder's speculations as to the possible Spanish provenience of the Pecos material, it is in-

[17] White, 1942, p. 268.

[18] *Ibid.*, pp. 267–8. The italics are mine. White footnotes that he has "witnessed the making of these clay images in a household at Tamaya on Christmas eye. . . . While continuing to participate in conversation with us, the husband leisurely modeled one figure each of the following: cow, deer, sheep, horse, chicken and turkey (Fig. 25)."

[19] Parsons, 1939, p. 336.

[20] Parsons, 1919, p. 279. See diagram, Fig. 35.

[21] Parsons, 1939, p. 317. The italics are mine.

[22] *Ibid.*

[23] Fewkes, 1923, p. 562.

[24] Fewkes, 1906, pp. 369–70.

[25] See page 129.

[26] Parsons, 1939. Italics are mine.

[27] Parsons, 1919, pp. 279–86.

teresting to note what Parsons has to say on the subject:

Is the itsumawe ritual of Spanish provenience? Its association at Zuni as well as at Acoma and Laguna with the *santu* cult and, at Zuni, with poshaiyanki also, a personage associated with Christian lore, is highly suggestive of Spanish origin. On the other hand in the excavations at Hawikuh, one of the Zuni towns at the coming of the Spaniards, figurines (fig. 38) which are like the modern Zuni figurines are found, Mr. Hodge tells me, *in refuse heaps at all levels, pre-Spanish as well as post Spanish.*[28]

Parsons also illustrates one of the eight figurines of similar workmanship which F. H. Cushing found in southern Arizona *under a hut floor* outside the pueblo.[29] According to Cushing:

. . . disposed precisely as would be a modern sacrifice of the kind in Zuni, the paraphernalia of a herder's sacrifice, namely, the paint-line encircled perforated medicine cup, the herder's amulet-stone of chalcedony, and a group of at least fifteen remarkable figurines. The figurines alone, of the articles constituting this sacrifice, differed materially from those which would occur in a modern Zuni "New Year Sacrifice" of the kind designed to promote the increase and prosperity of its herds. While in Zuni these figurines invariably represent sheep (the young of sheep mainly; mostly also females), the figurines in the hut . . . represented . . . some variety, I should suppose, of the auchenia or llama of South America.[30]

Haury has expanded our acquaintance with the Cushing material as well as describing other figurines and miniature vessels excavated by the Hemingway expedition.[31] In discussing figurines and miscellaneous clay objects from Snaketown,[32] where over 500 figurines were found, Haury emphasizes problems of interpretation:

Although the Southwest lacks the bewildering array of types which have been demonstrated for the various cultures of Mexico, the trait is rapidly assuming an important position in the study of certain parts of the area. As in Mexico, *little can be said of the sociological side of our Southwestern figurines.* If toys, a greater variation in form and workmanship would be expected; if representations of divinities, one would look for more characteristic and marked attributes. Concentrations of figurines in some localities, as in the Gila Basin, the Prescott area, the Fremont River of Utah, and Pecos, suggest that they may have been the products of a cult.[33]

Similar questions arise as to manufacture and use of miniature pots. Haury writes in regard to those at Los Muertos:

Most of the miniature vessels are doubtless the work of children who were imitating their mothers . . . . But their smallness does not preclude the fact that they may not have been made for some express purpose . . . . Their occurrence was mainly confined to rooms and with child burials.[34]

Brew and Hack's find in northern Arizona also calls attention to "archaeological theory" on this small problem:

One of the largest ash heaps was trenched . . . . the most remarkable find, however, was a group of twelve miniature pots, nestled together near the top of the ash heap and surrounded and filled with coal ashes. Packed about them were several slabs of burned shale. The pots were unpainted but had been fired and left in place. It may be that they were made by a child, were forgotten, and never removed from the firing heap. Whatever their origin, they clearly prove that the ash heaps are the residues of pottery firing places.[35]

Hough in writing of the Hopi says:

Objects in miniature are made for the children. The potter constructs *toy vessels*, rattles and dolls (pl. 49, figs. 1, 2, and 3), and sometimes manufactures models of houses (pl. 49, fig. 5) . . . .[36]

Thus, contemporary Pueblo children are known to have toy vessels made for them; however, other miniature vessels are made for other purposes. Edmund Nequatewa refers to Brew and Hack's find and offers ethnological data (anthropological fact) which may throw light on the function of tiny pots when found under the circumstances the excavators describe.

In archaeological excavation in the Southwest, crude miniature pottery is frequently unearthed. It is often attributed to the work of children. Miniature pottery is not only found in prehistoric ruins but also in places where prehistoric people have burned their pottery, as was reported by J. O. Brew and John T. Hack (*Plateau, ibid.*, p. 8).

On a trip to the reservation in May, I found a woman moulding some pottery and beside her she had four tiny pieces she had moulded with her thumbs into a shape like the bowl of a spoon. I asked her if that was the work of one of her children. She said no, that she had made them herself. Then I asked her the purpose of it. She said that they were made as a charm to prevent further calamities to her pottery work. When anyone is unfortunate enough to run into a burial party, carrying a body to the cemetery, they always consider this a most unlucky happening. Therefore,

[28] *Ibid.*, p. 283. The italics are mine except for Parsons' italicizing the word "santu."

[29] *Ibid.*, Fig. 39, p. 284. In the Peabody Museum of Harvard University.

[30] *Ibid.*, pp. 283–4; Fig. 39, p. 284.

[31] Haury, 1945.

[32] Gladwin, Haury, Sayles, and Gladwin, 1937, p. 233.

[33] *Ibid.*, p. 238. The italics are mine.

[34] Haury, 1945, p. 108.

[35] Brew and Hack, 1939, pp. 11–2.

[36] Hough, 1918, pp. 235–96, Pl. 49. The italics are mine.

when this happens to a potter and she next starts to make pottery, the first set of pottery that she makes is miniature ware for the dead person. When she goes to burn her pottery she will start her fire in two places, one for her own pottery, and one for the dead person's pottery. Then she would put the dead person's pottery in its fire. She watches the fire and just as soon as the miniature pieces get red hot she washes her hands over the fire, over the pieces of pottery. In doing this she feels that she has washed away any unlucky calamity that might be caused by the dead person. After this rite is performed she can then place her own pottery in her own fire. The miniature pot cools off and then she, if she is not afraid, picks them up and carries them down to the burial ground. But if she is afraid to come near to the grave she will place the miniature pots at the edge of town at some place that she feels that the dead person will come and get them.

This is the way a Hopi potter discharms herself after an unlucky meeting with the dead people.[37]

Parsons mentions many instances of Pueblo clay miniatures of vessels both in archaeological sites and in the contemporary culture.

Hopi potters leave miniature clay vessels at their clay pits (Bartlett 1: 53), and in early Hopi sites are found clay miniatures of vessels. A miniature water jar was found near Cochiti: for Zuni, see miniature jar on altar (Stevenson 2: Pl. XXXV). At Gallo springs, southwestern New Mexico, hundreds of miniature vessels were found (Hough 1: 19). In the shrines at springs, in caves, in mountaintops throughout the head waters of the Gila, the territory of the Mogollon-Pueblo culture, miniature pottery vessels abound . . . .[38]

Images of what is wanted convey prayer . . . . In firing a large water jar, a miniature jar is cast into the fire to insure even burning.[39]

When these toys are found in contemporary cultures, they may be significant indicators of past customs or contacts. As Sayce observes:

. . . Objects, however, sometimes lose their original function, and survive only because they acquire a new use or a new significance, and have perhaps lost status. Such are the *toys* to which reference has been made in another connection (vide p. 129 et seq.). They may be considered as *vestigial remains in the body of culture, and they may be of much interest because of the light they throw upon the history of a culture.*[40]

The three miniature pots (Pl. XII) represent typical Navaho pottery shapes according to Hill,[41] Tschopik,[42] Keur,[43] the Franciscan Fathers,[44] and others. Hill pictures line drawings of a similar cooking pot and mug in outlines *d* and *h*. However, it is a well known fact that pottery making is now very rare among the Navaho.[45] In fact, there were no potters in the Chaco Canyon region, where we were doing field work, although we heard of one old woman in a distant canyon who still made pottery. The children who made the miniature clay vessels were not copying the *activities* of their family although there were heirloom pots in the house. This would seem to bear out Sayce's theory of "vestigial remains."

Of interest to us in the problem of Pueblo-Navaho contacts is Parsons' mention of the fact that with the Pueblo "feathers may be wordless petitions."[46] The Navaho toy cooking pot had a soft purple feather in it. Dr. Kluckhohn writes:

. . . the practice of putting a soft feather in such a clay vessel is a universal bit of Navaho folklore. The custom and belief is as follows:

Anyone (but especially a child) puts a hina acos ("live feather"—plumy feather obtained from a bird which is alive) in the pot and this brings rain or other sought blessings but most especially good health.[47]

A final point which may be mentioned is that we may profit from carefully noting child burials to see whether toys, either figurines or miniature pots (see Haury reference in footnote 34 above), have been buried with them. Fewkes reports finding in Arizona

. . . rudely made imitations of all kinds of pottery . . . usually in the graves of children, and . . . used as playthings before they were buried.[48]

Also Senter and Hawley report toys with Hopi and Navaho child burials.[49] These are sensitive indicators as to stage of acculturation and might show, for instance, when figurines appeared in the Navaho material culture or demonstrate their existence before elements of Pueblo culture became evident among the Navaho. Senter and Hawley report on two Navaho child burials which certainly indicate that children's grave goods may tell something as to cultural influences:

. . . With one was a box of Crackerjack and a tin cup.

[37] Nequatewa, 1939, p. 18.

[38] Parsons, 1939, p. 317.

[39] Parsons, 1939, p. 316.

[40] Sayce, 1933, p. 141. The italics are mine.

[41] Hill, 1937, pp. 7–10.

[42] Tschopik, 1941, pp. 9, 12, and 25. Illustrations of shapes.

[43] Keur, 1941, Plate 4.

[44] Franciscan Fathers, 1910.

[45] Tschopik, 1938, pp. 261–2; 1941, pp. 47–8.

[46] Parsons, 1939, p. 315.

[47] Kluckhohn, personal communication. Dr. Kluckhohn kindly obtained this information in the summer of 1942.

[48] Fewkes, 1895–96, pp. 624 and 658.

[49] Senter and Hawley, 1937, p. 133.

The other had a stick of red and white striped candy and a spoon. Their necklaces were of commercial beads;[50]

The foregoing references to miniature pots—found near firing places or clay pits, in shrines or in graves, or in the present or past context of play—indicate that they present an interpretive problem to archaeology similar to that of figurines. Thus, even trivial items may become charged with meaning and it is evident that Steward and Setzler were correct when they wrote:

> Candor would seem to compel the admission that archaeology could be made much more pertinent to general cultural studies if we paused to take stock of its possibilities.
>
> Surely it can shed some light not only on the chronological and spatial arrangements and associations of elements, but on conditions underlying their origin, development, diffusion, acceptance, and interaction with one another. *These are problems of cultural process, problems that archaeology and ethnology should have in common.*[51] . . . *Naturally it is more difficult in archaeology than in ethnology to ascertain the function of each implement. The purpose of some we cannot know at all; others may be known only imperfectly. Nevertheless, each had some function.*[52]

Here again we meet archaeological theory and anthropological fact! The value ethnological data may have in helping weight the guesses of archaeological interpretations, as in the instance of Kidder's Pecos figurines, should not be overlooked by excavators. At the same time I should be the first to agree with Strong when he writes, "archaeological research can correct as well as confirm concepts derived from historical and ethnological data."[53] And, although Strong has approached the "liaison" of archaeology and ethnology from a point of view opposite to that presented in this article, we are both actually of one mind in agreeing that, "It is already apparent that, critically applied, the combined ethnological and archaeological approach has possibilities that have as yet hardly been touched on."[54]

Parsons expostulates on

> . . . the interdependence of these two branches of anthropology, particularly among Pueblo cultures.
>
> It is hardly necessary to make a general brief for the kind of interdependence that prevails in our Southwest, where extant cultures are historically related to cultures under archaeological research. There is no dispute that the living culture has light to throw upon the buried one.[55]

Farmer stresses the situation with equal emphasis as related to Navaho archaeological work:

> A great deal of work has yet to be done in *dinétah* and vicinity to solve its many problems. The reconstruction of Navaho history by means of archaeological techniques is just being established and promises to be interesting and informative. There is, in this material, the opportunity to study cultural dynamics with much supporting data from ethnological and historical sources.[56]

In the future may archaeology in the Southwest and elsewhere provide the answers that it alone can uncover. However, before finally interpreting this data, may we try to "catch our archaeology alive" and see what added meaning ethnology can give to excavated material.

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[50] *Ibid.*

[51] Steward and Setzler, 1938, pp. 6–7. The italics are mine.

[52] *Ibid.*, p. 8. The italics are mine.

[53] Strong, 1936, p. 363.

[54] *Ibid.*

[55] Parsons, 1940, p. 214.

[56] Farmer, 1942, p. 77.

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# THE QUANTITATIVE INVESTIGATION OF ABORIGINAL SITES: COMPARATIVE PHYSICAL AND CHEMICAL ANALYSIS OF TWO CALIFORNIA INDIAN MOUNDS

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## I

THE investigation of archaeological sites in North America has in the past concerned itself predominantly with the discovery and examination of burials and artifacts and associated fauna. This purely qualitative approach has been essential to the elucidation of problems in the culture history of aboriginal man. At the same time, except in such cases where obvious stratigraphy displays itself, few efforts have been directed toward the analysis of the matrix itself, the deposits in which the more spectacular bones, pottery, and implements of war are embedded. Nevertheless, it is wholly possible that accumulations of debris, such as habitation mounds or midden deposits, may be able to supply information of a quantitative character which will throw light upon the population, living conditions, and ecological status of the former inhabitants. A recent study[1] based upon older excavations of California shell mounds has indicated the type of information which might be obtained. The present paper explores certain aspects of the methodology applicable to the general problem.

The quantitative analysis of material residues derived from primitive or prehistoric sites may proceed upon three levels: the cultural, wherein are investigated the amounts of artifacts, burials, habitation features, and their distribution; the mechanical, which concerns the quantity of measurable physical constituents, such as rock or bone; and the chemical, whereby the methods of soil chemistry are applied. We here consider the second and third levels.

## II

In the Indian mounds of central California certain materials occur in sufficient quantity and are of sufficient intrinsic importance to warrant utilization as test items for physical analysis. These are: (1) rock plus burned clay, (2) animal bone fragments, (3) obsidian chips, (4) charcoal, and (5) shell fragments. Two modes of procedure are possible: to dissect an entire mound and measure each component, and to analyze an adequate number of small samples. The latter is by far the simpler method but necessitates the application of standard, elementary statistical procedures.

The first mound studied was that known as "Petersen I." It lies about fifteen miles due east of Fairfield, Solano County, on the ranch of Mr. Harry Petersen, who kindly permitted us to conduct extensive excavation. The presence of small serrated arrowpoints, clam shell disk beads, modeled baked clay objects, and flexed burials would place this mound within the Late Period[2] of occupation. The site has been protected by a sterile cap of clay deposited by overflow of the Sacramento River, a feature resulting from levee building and hydraulic placer mining subsequent to 1850. The second mound was a typical San Francisco Bay shell mound which lies on the northern boundary of the city of Richmond on the property of Mr. Milton Meyer who generously allowed excavation for the purpose of securing samples. This site, here designated "Richmond I," is one of the few completely undisturbed shell mounds still extant in the bay region.[3] Its chronological position has never been determined due to the lack of significant cultural material but is probably to be ascribed to a relatively late period.

From each mound a series of fourteen samples were taken. The distance from the center of the mound varied, as did the depth. No attempt was made, however, to balance the series with respect to either of these factors since the total number of samples was too small to warrant accurate estimates of intra-mound distribution. Each sample, amounting to 2–5 pounds dry weight, was taken from previously undisturbed ground and placed in a paper bag for subsequent examination.

In the laboratory the mound soil was air-dried at approximately 90° C. and weighed. It was then passed through a sieve with one-eighth inch (2 mm.) apertures. The material retained was saved for separation. That passing the

[1] Cook, 1946.

[2] Lillard, Heizer, and Fenenga, 1939.

[3] Site 275 of Nelson's San Francisco Bay survey. Nelson, 1909.

TABLE 6. MOUND: PETERSEN I

(All data show per cent by weight in the sample of material held by one-eighth inch screen.)

| | Depth in Inches | Rock and Burned Clay | Bone Fragments | Charcoal | Shell Fragments | Obsidian Chips |
|---|---|---|---|---|---|---|
| Pit A | 16 | 33.4 | 0.851 | 0.168 | 0.012 | 0.015 |
| Pit B | 8 | 35.5 | 0.177 | 0.015 | 0.002 | 0.003 |
| Pit H | 10 | 36.9 | 0.013 | 0.001 | 0.015 | 0.012 |
| Pit H | 16 | 19.0 | 0.026 | 0.000 | 0.000 | 0.002 |
| Pit H | 24 | 12.8 | 0.000 | 0.000 | 0.000 | 0.000 |
| Pit G | 16 | 12.6 | 0.123 | 0.019 | 0.003 | 0.002 |
| Pit G | 32 | 36.6 | 0.054 | 0.000 | 0.009 | 0.001 |
| Pit F | 10 | 24.7 | 1.673 | 0.120 | 0.030 | 0.000 |
| Pit I | 12 | 27.4 | 0.745 | 0.614 | 0.014 | 0.000 |
| Pit I | 30 | 20.9 | 0.185 | 0.011 | 0.006 | 0.001 |
| Pit J | 12 | 22.3 | 0.565 | 0.108 | 0.001 | 0.002 |
| Trench B, 5′ in | 15 | 21.8 | 0.168 | 0.023 | 0.009 | 0.000 |
| Trench B, 12′ in | 12 | 28.8 | 0.480 | 0.433 | 0.018 | 0.004 |
| Trench B, 12′ in | 24 | 19.8 | 0.092 | 0.018 | 0.000 | 0.004 |
| Mean | | 25.18 | 0.366 | 0.109 | 0.009 | 0.0033 |
| Standard error | | 2.15 | 0.125 | 0.050 | 0.0023 | 0.0012 |
| S.E. in per cent of mean | | 8.5 | 34.1 | 45.8 | 25.5 | 36.3 |

TABLE 7. MOUND: RICHMOND I

(Data as in Table 6.)

| | Depth in Inches | Rock and Burned Clay | Bone Fragments | Charcoal | Shell Fragments | Obsidian Chips |
|---|---|---|---|---|---|---|
| Pit A | 2 | 5.6 | 0.048 | 0.097 | 43.7 | 0.0 |
| Pit A | 8 | 8.4 | 0.106 | 0.260 | 45.9 | 0.0 |
| Pit B | 12 | 5.9 | 0.149 | 0.110 | 44.3 | 0.0 |
| Pit B | 30 | 19.7 | 0.048 | 0.018 | 43.0 | 0.0 |
| Pit B | 46 | 11.4 | 0.034 | 0.023 | 55.7 | 0.0 |
| Pit C | 16 | 8.4 | 0.038 | 0.048 | 50.4 | 0.0 |
| Pit D | 17 | 8.4 | 0.131 | 0.027 | 47.9 | 0.0 |
| Pit E | 18 | 6.4 | 0.073 | 0.101 | 39.8 | 0.0 |
| Pit F | 22 | 5.1 | 0.045 | 0.071 | 48.7 | 0.0 |
| Pit G | 15 | 7.0 | 0.061 | 0.096 | 48.0 | 0.0 |
| Pit H | 15 | 9.2 | 0.047 | 0.067 | 42.8 | 0.0 |
| Pit I | 15 | 12.7 | 0.036 | 0.014 | 41.0 | 0.0 |
| Pit J | 15 | 15.2 | 0.063 | 0.007 | 38.8 | 0.0 |
| Pit K | 18 | 5.7 | 0.024 | 0.068 | 52.9 | 0.0 |
| Mean | | 9.24 | 0.064 | 0.072 | 45.9 | 0.0 |
| Standard error | | ±1.18 | ±0.010 | ±0.017 | ±1.31 | 0.0 |
| S.E. as per cent of mean | | 12.7 | 15.6 | 23.6 | 2.8 | — |

seive was further screened and used for other purposes. The mass of larger particles was then washed in order to remove adhering dirt and to disintegrate lumps of soil and clay. After having been thus cleaned, the material was examined piece by piece and segregated into its recognizable components. Each of the latter, finally, was dried and weighed.

The critical screen size, one-eighth inch, was selected because it retains those particles the

nature of which can be detected with reasonable ease with the naked eye. Smaller screens would of course segregate more material but a binocular microscope would be necessary for separation of individual particles, an operation which would preclude the use of sufficiently large samples. With rock, bone, or any other discrete constituent the particle size obviously grades consistently from very large through the readily visible to the microscopic and even the ultramicroscopic. Hence, we can never determine by purely mechanical means the absolute total of any component in the entire sample. It is obligatory to draw the line at some standard and convenient screen size and to express results in terms of such dimensions. The data presented in Tables 6 and 7 show the observed quantity of each mound component expressed as per cent by weight per sample.

Within each column the variability of estimate is indicated by the mean and its standard error. According to the commonly accepted statistical theory the true mean probably lies within the range of the observed mean plus or minus the standard error. For example, the mean per cent by weight of shell fragments in Richmond I is $45.9 \pm 1.31$. Consequently, the mean expected to be found in any other fourteen samples, and hence the entire mound, would probably lie between 44.6 and 47.2. The accuracy of sampling in the actual case may also be expressed in relative terms by converting the standard error to per cent of the mean. For shell in the Richmond mound this value is $\pm 2.8$ per cent.

An inspection of the tables shows that certain mound components, particularly bone and charcoal, evince a relatively high variability and *pari passu* a low accuracy of estimate. An improvement, if desired, may be obtained by increasing the sample size or the number of samples. However, in order to halve the standard error the sample size must be doubled or the sample number multiplied by four, procedures which are not always feasible or desirable.

The most conspicuous difference between the two mounds is the shell content. The Richmond mound contains the large amount of shell characteristic of the Bay mounds in general. The mean of our samples, 45.9 per cent by weight held by a one-eighth inch screen, conforms with results obtained elsewhere by Nelson, Gifford, and others. The Petersen mound shows a scattering of shell derived probably exclusively from the river mussel (*Gonidea angulata*, *Margaritifera magaritifera*). Our data show a value of 0.009 per cent by weight. The statistical significance of the difference between the mounds is demonstrated by the critical ratio (equivalent to Fischer's $t$ value) between the means (given by the formula):

$$\text{C.R.} = \frac{\text{difference between the means}}{\sqrt{(\text{S.E. of first mean})^2 + (\text{S.E. of second mean})^2}}$$

The value is 34.72, implying that there is only one chance in many thousands that the observed difference is due to sampling error.

The rock or stone was weighed without any attempt to discriminate sub-types except obsidian. In the Petersen mound particularly there was considerable baked or burned clay, an item which may be of importance in assessing the cultural status of the inhabitants. Nevertheless, it is so difficult to distinguish small particles of this material from natural rock that for present purposes it was decided to include clay with rock. The mean for Petersen I was 25.18 per cent and for Richmond I 9.24 per cent. The critical ratio is 6.53, indicating a highly significant difference. At first sight, therefore, the density of rock and clay is much greater in one mound than the other. It should be remembered, however, that nearly one-half the content of the Richmond mound is shell, a component referable to the characteristic dietary habits of its builders. If we deduct the shell, we may then compare the relative quantity of rock in the remainder of the mound mass with that in the Petersen mound as a whole. Under these circumstances the mean per cent by weight of rock in the Richmond mound becomes 17.15 and the critical ratio 2.69. This lies, for fourteen samples, between the one and five per cent levels of probability and hence is barely significant. It is doubtful, therefore, whether one could insist upon any distinction of cultural importance with respect to rock and clay.

A disparity in the content of animal bone might be anticipated in view of the greater dependence upon shellfish on the part of the Richmond dwellers. The mean found here for Petersen I was 0.366 per cent and for Richmond 0.064 per cent, results which appear to bear out such an hypothesis. Nevertheless, the variation of bone content from sample to sample is so great that the critical ratio between the means is only 2.41 which implies little statistical significance. If we allow for shell content, as in the

case of rock, even this significance vanishes, and the conclusion would be in order that the inhabitants at the two sites consumed substantially the same per capita quantity of animal food. Greatly increasing the sample number might so far reduce the standard error as to demonstrate a real difference, but such a difference might still be negligible from the dietary point of view.

The mean content in particles of charcoal is 0.072 per cent in Richmond I and 0.109 per cent in Petersen I. The critical ratio is 0.7, indicating no significant difference whatever. Such a result is more or less to be expected, since both were habitation mounds, subject to essentially the same treatment with respect to camp fires, cooking, and protection from cold.

The situation with respect to obsidian is of interest from the methodological aspect, since we are here bordering on the realm of artifacts. The obsidian found in the samples and utilized in this study was in the form of rejected implements and chips which were discarded presumably in the manufacture of the finished product from unworked blocks. They are therefore an index to the extent of this type of industry.

The mean obsidian by weight in Petersen I was 0.0033 per cent, a very small quantity, whereas there was none at all found in the Richmond samples. The critical ratio of the means is 2.75, which lies just at the one per cent level of probability and hence may be regarded as showing a definitely significant difference. Despite the accepted validity of this result some further confirmation is desirable, particularly in view of the very sparse occurrence of obsidian chips.

It is to be noted that, irrespective of size or weight, at least one scrap of obsidian is present in ten out of the fourteen Petersen samples, whereas none occur in any of the fourteen Richmond samples. Now let us set up the hypothesis that the two mounds are actually identical in obsidian content and its apparent absence at Richmond I is really due to inadequacy of sampling. This hypothesis may be tested, then accepted or discarded by the method of chi-square. Thus, on the basis of Petersen findings, fourteen samples from Richmond I should show 10 samples with obsidian present, 4 samples with it absent. In our samples it is present in none, absent in 14. Solving, the value for chi-square is 17.14. Hence the probability that the hypothesis is correct is approximately two in ten thousand, and consequently a real difference in obsidian content may be conceded to exist between the two sites.

The quantity of any constituent in a whole mound may be calculated if the total mass is known. As a rule mounds are at least slightly irregular in dimensions and some degree of approximation is necessary (unless the entire mound is excavated and weighed). The two mounds here under consideration are nearly circular in outline. They also tend to show an even curvature from periphery to center and the base may be regarded as essentially level. For purposes of estimate, therefore, it is possible to regard each as a segment of a sphere. The formula may then be directly applied: volume $=1/6\pi h(h^2+3a^2)$ where $a$ is the radius of the base and $h$ is the height. For Petersen I, $h$ is equal to 0.89 meter and $a$ is 13.0 meters; for Richmond I $h$ is 2.13 meters and $a$ is 30.5 meters. The volumes are then, respectively, 234 and 3114 cubic meters. The mass is also a function of the density, a factor which probably varies somewhat within the mound and is also dependent upon the degree of compactness, moisture content, and other considerations. In the absence of specific experimental work, however, we may tentatively accept the value of 1.3 for the specific gravity since approximately this figure was obtained by earlier investigators for certain Bay region mounds, and by us (unpublished data) for other valley mounds. The mass of Petersen I then becomes 304 metric tons and that of Richmond I 4048 metric tons. The mean per cent of bone found in Petersen I was 0.336 per cent $\pm 0.125$. Disregarding the standard error of estimate, and considering that 0.336 per cent comes fairly close to representing the true value, we find that the total bone in the mound must be approximately 1113 kilograms. Now this bone is thoroughly dried and moreover has lost all its organic material. It is usually stated, at least for mammals, that the dry weight of the bone equals about 6 per cent of the fresh weight of the animal. For birds the figure would be somewhat less. If we allow for the loss of the organic constituents, through scores or hundreds of years of slow oxidation and bacterial action, we may reduce the relative dry weight to 4 per cent. The original fresh weight of the animals represented by the bone in the mound would then be 27,825 kilograms. Now the edible portion of an animal or bird, by aboriginal standards amounted to at least 80 per cent of the carcass, since everything was consumed except bone, claws, hide, hair, feathers, and per-

haps the tougher tendons. The existing bone therefore points to a total reservoir of 22,260 kilograms of meat. This can represent no more than a minimum estimate since all the bones of all animals can scarcely have been preserved in the mound. If an allowance is made of roughly an equivalent quantity lost through destruction, removal by local wild animals, mere throwing away to a distance, and other factors, we may raise the previous estimate to, say, 40,000 kilos, or 40,000,000 grams.

The average number of persons inhabiting the mound could not easily have exceeded twenty-five. If we make the wholly unsupported assumption that each individual received an ounce, or 30 grams of fresh meat a day, then the supply was adequate to have maintained the population for nearly 150 years. If the supply per person per day was less, then the time becomes greater and vice versa. On the whole the probabilities favor a very respectable intake of animal protein plus vitamins derived from animal sources—that is, very respectable in terms of aboriginal diet.

The shell content of Petersen I is only 0.009 per cent, as far as we can judge exclusively derived from the river mussel. A parallel calculation indicates for the site only 900 mussels, a quantity totally insignificant from the dietary standpoint.[4]

Richmond I contains close to 45.9 per cent shell, or 1,858,000 kilograms, predominantly, if not exclusively, bay mussel. Laboratory determinations, cited in a previous paper[5] show a mean weight of 2.5 grams per shell. This indicates 743,200,000 mussels in all. The calculations set forth in the work mentioned were based upon the data of Nelson for the Ellis Landing Mound, including the estimate given by Nelson,[6] supported by Gifford,[7] that the latter mound carried a population of 100 persons. Nelson[8] gives the dimensions of the Ellis Landing site as having been 460 by 245 feet, which means an area of 10,469 square meters. Petersen I, estimated by us as being inhabited by a maximum of 25 persons, has an area of 531 square meters. The area of Richmond I is approximately 2900 square meters. Hence, the population must have lain between 25 and 100, probably nearer the former. Fifty would be as close an approximation as its possible under the circumstances. If now we accept Nelson's estimate of 50 mussels per person as the average daily consumption, the age of the mound, or rather the duration of its occupancy, is $743,200,000 \div 2500 \div 365$, or 815 years. This figure is not unreasonable in view of comparable estimates for other mounds of the region.[9]

The bone content of Richmond I was given as 0.064 per cent $\pm$ 0.01. Using the method applied to the Petersen mound, it can be shown that this represents 64,767 kilograms of fresh animals, or 51,814,000 grams of food. For Petersen I an average daily per person consumption of 30 grams was assumed. But at the Richmond site the inhabitants depended very heavily upon shellfish and only secondarily on the flesh of birds and mammals. Hence, the daily intake may be taken as much less, say 5 grams. With a population of 50 persons this supply would have covered $51,814,000 \div 250 \div 365$, or approximately 570 years. This checks moderately well with the age as determined by the assumed shell consumption.[10]

The content of rock plus baked and burned clay in Petersen I, based on percentage composition and total mass of mound, was 88,800 kilograms. What this signifies in terms of human labor is indicated in general terms if we assume a population of 25 persons and an occupancy of 150 years as suggested by the bone analysis. The annual increment would have been 592 kilos in all or 23.7 kilos per person. Since there is no naturally occurring rock in the entire countryside these quantities had to be carried in by hand, or the equivalent amount of clay had to be secured and fired. In Rich-

[4] From the data it appears that the Richmond inhabitants not only had access to substantially the same quantity of mammal and bird meat as did those of the Peterson mound but in addition were able to secure large amounts of shell fish. Therefore the diet of the Peterson mound inhabitants must have been supplemented by such perishable foodstuffs as acorns, tule roots, bulbs, and other plant material.

[5] Cook, 1946.

[6] Nelson, 1910.

[7] Gifford, 1916.

[8] Nelson, 1910, p. 371.

[9] The weakest point in all these calculations is the estimate of average number of inhabitants. It is difficult to understand why archaeologists, in cooperation with modern ethnologists, have not assembled adequate data for a reasonably close quantitative assessment of population density on habitation sites.

[10] These calculations of age based upon bone are contingent upon the statistical validity of the means. The latter, it should be repeated, show a wide standard error due to variation in the samples, and are employed here with the clear reservation that they represent simply the most probable values under the circumstances.

mond I the total rock is 374,000 kilograms, but since the population was larger and the duration of occupancy longer, the per person increment was probably only about half that characteristic of the other mound.

With respect to obsidian it has already been noted that no flakes or chips were found in the Richmond site whereas they were present in the Petersen mound. The inference is therefore legitimate that few if any obsidian implements were manufactured at the Richmond site. The presence of completed obsidian artifacts but the absence, or near absence, of obsidian flakes and rejects in Bay mounds suggest importation of completed specimens from outside the area and a lack of manufacture within the area. On the other hand, Petersen mound produces evidence of local manufacture which implies importation of quantities of rough material. This difference is, in part, understandable when we consider the proximity of the natural sources of obsidian and the direction of well developed trade routes. Petersen mound lies not only closer to the obsidian quarries of Napa and Lake Counties[11] but likewise directly in the path over which such extensive trade commodities as clam shell disk beads and magnesite were passing from the Coast Ranges to the Great Valley.

At the Petersen site there was 0.0033 per cent of obsidian by weight, or 10 kilos in the entire mound. There must therefore have been some productive activity, even though it was confined to the final finishing of crude pieces or blanks acquired through trade. We have no means of knowing the wastage during such operations, at least in terms of the relative weight of the original piece which was lost as chips. A rough guess would be 5 per cent. If such were the case, then the 10 kilograms of chips represent 200 kilos of implements. Whether this would be an adequate supply for the life of the mound may be seriously doubted. However, this question also cannot be settled without further evidence concerning the use of obsidian.

To summarize briefly the foregoing, we may state that a mechanical separation of certain components from a relatively small number of samples makes possible a statistically reasonable estimate of the percentage composition of a mound. The total quantity of the components studied may also be calculated and comparisons between mounds may be drawn within accuracy which is by no means ideal but which nevertheless is far superior to that characteristic of purely subjective estimates. Based on total quantities of individual items such as bone, shell, rock, or obsidian, further deductions are possible concerning the living condition of the mound inhabitants and perhaps with respect to the time of occupancy of the mound. However, such attempts as have been made here, while designating the direction to be taken, also emphasize the need of still further sound analyses of every material constituent to be found in aboriginal sites, even those generally regarded as purely cultural or ethnographic in nature.

[11] Heizer and Treganza, 1944.

## III

That Indian mounds may differ in their chemical constituents is to be suspected from the observed variations in texture, compactness, color, and other physical properties. Moreover, if such differences occur they might be shown to have a temporal as well as ecological significance with respect to the human occupation. It was our purpose in this study merely to determine the existence or absence of chemical variations without pressing far into their possible meaning. Three types of analyses were made: for hydrogen ion concentration, for lime as $CaCO_3$, and for organic carbon. The pH was determined electrometrically on an aqueous extract of a 1 mm. sifting of each sample. The lime was estimated as $CO_2$ from carbonate after treatment with 1 N HCl. For organic carbon a few grams of the fine sifting was extracted with HCl to remove the inorganic carbon, washed, dried, and then ignited. The resulting $CO_2$ was absorbed in a solid commercial preparation, "Caroxite," and weighed. The results are incorporated in Tables 8 and 9.

It is noteworthy that for each of the three substances there is a difference in mean values between the two mounds. Moreover, in each case this difference is statistically highly significant (for pH, C.R. = 5.37; for $CaCO_3$, C.R. = 13.10; for organic carbon, C.R. = 6.53). No further evidence is necessary to establish the fact that Petersen I and Richmond I are chemically distinct. An entirely new field for investigation is therefore opened up, one which might be designated chemical archaeology.

Few inferences can at present be drawn from the data here presented. The extremely high lime content of the Richmond mound can prob-

TABLE 8. MOUND: PETERSEN I

(The data for calcium carbonate and organic carbon show per cent by weight in the material passed through a 1 mm. screen.)

| | Depth in Inches | pH | $CaCO_3$ | Organic Carbon |
|---|---|---|---|---|
| Pit A | 16 | 8.58 | 5.8 | 3.8 |
| Pit B | 8 | 8.70 | 8.1 | 2.8 |
| Pit H | 10 | 8.30 | 3.8 | 3.2 |
| Pit H | 16 | 8.65 | 19.9 | 6.2 |
| Pit H | 24 | 8.40 | 15.8 | 2.1 |
| Pit G | 16 | 8.92 | 7.8 | 2.7 |
| Pit G | 32 | 8.52 | 11.9 | 2.2 |
| Pit F | 10 | 7.78 | 4.7 | 5.7 |
| Pit I | 12 | 8.38 | 4.7 | 5.2 |
| Pit I | 30 | 8.77 | 3.2 | 2.7 |
| Pit J | 12 | 8.60 | 6.9 | 3.3 |
| Trench B, 5′ in | 15 | 8.28 | 1.5 | 3.3 |
| Trench B, 12′ in | 12 | 7.88 | 2.3 | 5.6 |
| Trench B, 12′ in | 24 | 8.35 | 0.9 | 3.6 |
| Mean | | 8.44 | 6.95 | 3.74 |
| Standard error | | 0.082 | 1.48 | 0.370 |
| S.E. as per cent of mean | | 0.97 | 21.29 | 9.89 |

TABLE 9. MOUND: RICHMOND I

(Data as in Table 8.)

| | Depth in Inches | pH | $CaCO_3$ | Organic Carbon |
|---|---|---|---|---|
| Pit A | 2 | 8.08 | 39.2 | 7.5 |
| Pit A | 8 | 7.50 | 34.9 | 5.7 |
| Pit B | 12 | 7.78 | 35.2 | 7.9 |
| Pit B | 30 | 8.00 | 39.0 | 5.0 |
| Pit B | 46 | 8.22 | 41.7 | 4.4 |
| Pit C | 16 | 7.97 | 35.7 | 8.1 |
| Pit D | 17 | 7.95 | 37.4 | 6.5 |
| Pit E | 18 | 8.10 | 46.8 | 2.9 |
| Pit F | 22 | 8.02 | 32.3 | 7.0 |
| Pit G | 15 | 7.85 | 31.2 | 8.9 |
| Pit H | 15 | 7.92 | 25.9 | 8.8 |
| Pit I | 15 | 7.92 | 26.1 | 8.4 |
| Pit J | 15 | 7.90 | 29.3 | 12.1 |
| Pit K | 18 | 7.95 | 38.0 | 6.8 |
| Mean | | 7.94 | 35.19 | 7.14 |
| Standard error | | 0.044 | 1.57 | 0.604 |
| S.E. as per cent of mean | | 0.55 | 4.46 | 8.45 |

ably be ascribed to finely comminuted shell of even submicroscopic dimensions. No such explanations, however, can be offered for the presence of considerable lime in the Petersen mound. Indeed, the almost universal presence of calcium carbonate in California Indian mounds is a phenomenon which strongly demands elucidation.

Despite the very much higher lime content of the Richmond mound, the pH is definitely lower than in the Petersen mound. This anomaly may perhaps be referable to the higher quantity of organic material in the former, but the chemical details need to be worked out. Moreover, why does the Richmond mound contain more organic matter? Is it due to the decomposed organic residues from the shell? Is is due to some long-term difference in the other plant and animal material brought to the mound during its occupancy? Is it due to soil and vegetational variation in the surrounding terrain? These questions will have to be left unanswered until further study can be devoted to the problem.

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# CRANIA FROM THE WARREN MOUNDS AND THEIR POSSIBLE SIGNIFICANCE TO NORTHERN PERIPHERY ARCHAEOLOGY

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ARCHAEOLOGICAL investigation in the Northern Periphery, in its present status, has revealed and formulated many perplexing problems. Not the least of these is the problem of the ethnic prehistory of its Puebloid peoples.

Apparently, because of the striking resemblances between the Northern Periphery cultures and the San Juan Puebloan cultures, Judd, in his expeditions of 1915–1920, tacitly assumed Northern Periphery peoples to be Puebloan in physical characteristics. The crania found by him in the southern part of this area exhibit both occipital deformation and normality. This phenomenon was interpreted by Judd as the most significant observation to be made. He felt that it indicated the use of the Puebloan cradleboard when the trait was either in an incipient form or in a period of decline.[1] Equally plausible, of course, is the possibility of two distinct periods, a pre-cradleboard period and a period after the introduction of the cradleboard.

Further investigation continued to show the existence of occipitally deformed and normal crania associated with the Puebloid cultures of the region. Deformed crania from the Nine Mile Canyon country were found by Morss and Gillin.[2] Undeformed crania were reported from southern Nevada by Harrington, and from the Great Salt Lake and Fremont River areas by Steward.[3]

The most speculatively valuable specimens were found by Steward during his expeditions of 1930 to 1933 to the Great Salt Lake region. In a 1933 publication Steward first noted the existence of crania non-Puebloan in type. At that time he characterized them as being "long, undeformed," and pointed out that they had "high orbits, strong supra-orbital ridges, and occipital bulges, all of which are characteristic of modern Shoshoneans.[4] In 1936 he further developed this hypothesis. In spite of the scantiness of the skeletal material, Steward suggested that the basic peoples of the Northern Periphery were of a physical type similar to the Shoshoneans. The culture of these people was comprised of a blend of "Basketmaker and Pueblo 1" traits. Later, through diffusion and a migration of a broad-headed people, some few "Pueblo 2" traits were adopted. This development barely reached the Great Salt Lake region.[5] In 1940, Steward again partially revised this opinion. Two of the original Great Salt Lake crania were examined by T. D. Stewart and were found to be brachycephalic, low vaulted, and not in accord with the Shoshonean type.[6] Steward has left the problem with the following indications:

1. The original Northern Peripheral peoples were neither Puebloan nor Shoshonean in physical type. Their culture showed a "blend" of Basketmaker, "Pueblo 1," and non-Pueblo traits. This culture he termed "Phase 1."

2. Later migrations brought Puebloan physical types and "Pueblo 2" cultural traits; this situation resulted in what he called "Phase 2." "Phase 2" was not present to any extent in the Great Salt Lake region.[7]

While these speculations are most interesting the data have been sufficient to permit only the barest outlining of the problem.

During the spring of 1946 the Anthropology Museum of the University of Utah excavated a number of mounds in Warren, Utah. This site is located near the mouth of the Weber River, approximately seven miles west of Ogden, Utah. The cultural material from this site included Great Salt Lake Plain Grey and Punched wares, Utah type metates and manos, figurines, and bone work. The house structures were of the Willard type.[8] All of these traits are indicative of the "Phase I" culture, as described by Steward. The excavations were interrupted to permit the owner of the land to level the site for farming purposes. During the leveling proc-

* Expedition, spring 1946, financed by grant from University of Utah.

[1] Judd, N. M., 1926, pp. 150–1.

[2] Morss, N., 1931, p. 28; Gillin, J., 1938.

[3] Harrington, 1927, p. 269; Steward, 1936, pp. 56–7; Steward, 1941, p. 319.

[4] Steward, 1933, pp. 15–16.

[5] Steward, 1936, pp. 56–7, 60–1.

[6] Cited by Steward, 1940, p. 471 (footnote).

[7] *Ibid.*, pp. 471–2.

[8] Unpublished material, Anthropology Museum, University of Utah.

ess six burials were uncovered. Each burial was found at the bottom of a mound, under the floor level of the enclosed pit lodge. While the burials were somewhat damaged by the leveling equipment, it was possible to determine that the bodies were buried in a flexed position. In spite of the degree in which the crania were fragmented, certain measurements and descriptions were made and seem to be of some importance.

To these six specimens a seventh cranium (no. 18496), found in a neighboring field, has been added. It was donated to the University of Utah several years ago. Considering the observations noted and the measurements tabulated later in this paper, it would seem likely that this latter cranium falls well within the same classification as the other six. An eighth cranium (no. 19039), donated to the University by Mr. George East of Warren, is distinctly different from the rest, and as the conditions under which it was found are not known, it may not have any relationship to the Warren crania.[9] (It is included on the anthropometric chart, Table 10, as cranium no. 8.)

The anthropometric methods of Hrdlička are followed.[10] The instruments were the standard type.

### DESCRIPTION OF SPECIMENS

*Burial no. 1* (20593). The skeletal material, that of an adult male, consists of the major portions of the cranium, the basilar portion of the occipital; the left frontal and facial parts are missing (Pl. XIV, *a*). However, the skull is complete enough to support certain observations. The vault viewed from above is pentagonal in shape. The skull is brachycephalic, with a flat vertex accentuated by prominent parietal eminences, and is apparently of the chamaecephalic type. The supraorbital ridges are moderate, and the forehead moderately sloping. There is no deformation of the occipital region; the occiput is prominent, having a marked protuberance of the inion (Hook type) and also having well developed occipital crests. The sutures are moderately serrated, and one small Wormian bone is situated at the lambda. The chin is rounded with marked protrusion. The first and second molars are present, showing marked wear and a large cavity approximately 0.5×0.5 cm. in the second molar.

*Burial no. 2* (20594). The second skull, a child of approximately seven years, has the same general characteristics as no. 1 (20593). The facial portion is missing, but enough is present to determine the cephalic index, which indicates the form to be brachycephalic (Pl. XIV, *b*). The

TABLE 10. INDICES AND MEASUREMENTS FROM THE WARREN SITE AND COMPARISON WITH KANOSH AND GRANTSVILLE CRANIA

| | Cephalic Index | Height-Length Index | Height-Breadth Index | Orbital Index | Facial Index (upper) | Basion-bregmatic Height | Auriculo-bregmatic Height | Alveolar Point Nasion | Naso-Basilar Diameter | Basion-alveolar Diameter | Bizygomatic Diameter | Nasal Breadth | Nasal Height | Facial Angle | Alveolar Angle | Nasal Index |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| No. 1 (20593), male | 83.2 | | | | | | 10.8 | | | | | | | | | |
| No. 2 (20594), child | 86.4 | | | | | | 10.0 | | | | | | | | | |
| No. 3 (20595), female | | | | | | Fragmentary | | | | | | | | | | |
| No. 4 (20596), male | | | | | | 12.0 | 10.1 | | | | | | | | | |
| No. 5 (20597), female | | | | | | | 10.6 | | | | | | | | | |
| No. 6 (20664) | | | | | | Fragmentary | | | | | | | | | | |
| No. 7 (18496), female | 82.1 | 72.4 | 87.3 | 84.8 | 51.9 | 12.5 | 10.9 | 6.7 | 9.7 | 9.6 | 12.9 | 2.3 | 4.8 | 70.0 | 30.7 | 47.9 |
| No. 8 (19039), male (Shoshone) | 74.3 | 72.1 | 97.1 | 82.9 | 54.2 | 13.5 | 11.9 | 7.6 | 10.6 | 9.9 | 14.0 | 2.7 | 5.5 | 73.0 | 62.0 | |
| Kanosh (10861), female | 85.4 | 69.7 | 82.4 | 94.7 | 52.6 | 12.2 | 10.9 | 6.9 | 9.7 | 9.5 | 13.1 | 2.3 | 5.7 | 70.0 | 55.0 | |
| Grantsville (11301), female | | | 75.3 | | | 11.9 | | | | | | | | | | |

[9] Catalogue numbers are those of the Anthropology Museum, University of Utah.

[10] Hrdlička, 1920.

vault is low and accentuated by the prominent parietal eminences. The forehead is rounding, and the occiput moderately protruding. No occipital deformation is evident. The vault from the superior bears the pentagonal shape which is formed by the pronounced parietal eminences, the developed occiput, and external occipital tubercle.

*Burial no. 3* (20595). The skull, completely fragmented, is apparently that of an adult female. No measurements were obtainable. However, the fragments do point toward the general characteristics of the Warren physical type, that is, brachycephalic and low vaulted, with pronounced parietal eminences and no visible deformation. The occipital bone contains an iniac fossa, and the remaining three molars show signs of decay.

*Burial no. 4* (20596). The skull, that of a young male adult, is heavy boned, and minus the anterior portion of the frontal bone and face, but it appears to be brachycephalic (Pl. XIV, *c*). The basilar portion is complete, enabling the basibregmatic height to be taken. The vault is low and ovoid in shape. The occiput possesses the usual development with no occipital deformation. There is no sharply defined iniac crest, but rather a protruding torus extending laterally across the occipital bone. The parietal eminences are prominent, accentuated by the low vertex. At the base, the foramina Lacera are medium in size, and a slight depression of the petrous bones below the basilar process is noted. The styloids are small, and an inequality exists between the two jugular foramina. The right foramen measures 1.5×1.4 cm.; the left, 1.1×0.7 cm. The lower jaw is missing.

*Burial no. 5* (20597). The fact that this skull, an adult female, was almost a sagittal section, with the exception of the complete occipital bone, made it impossible to obtain a cephalic index and other measurements except the left auriculo-bregmatic height. The vault from the superior bears the ovoid shape. The supraorbital ridges are slightly developed and join a rounded forehead. The parietal eminences are prominent, the vault low, and the occiput moderately protruding, but with no deformation. There is a nearly complete synostosis of the left half of the lambdoidal suture; the serrations are medium. The lower jaw is moderately pointed and combined with marked protrusion. A left tibia present with the skull was measured, and an estimated height of 173 cm. given to this individual.

*Burial no. 6* (20664). The sixth skull associated with the site in question consists of the frontal bone only; hence, no measurements are possible. Apparently it conforms to the general physical type in that the indications are toward a low vault and a brachycephalic index.

*Burial no. 7* (18496). The skull, that of a female approximately twenty years of age, is the most complete of the seven burials found. Every valuable index and measurement was available (Pl. XIV, *d*).

The skull is brachycephalic. The basibregmatic index indicates a moderately orthocephalic vault. The supraorbital ridges are slight and feminine, the forehead round, and the eminences slightly bulging. The vault from the superior is pentagonal in shape. The sagittal region is moderately flat and accentuated by the pronounced parietal eminences. The occipital region bulges moderately with no deformation. The serration of the sutures is complex, with indications of synostosis along the central third of the coronal suture. Several Wormian bones are located along the lambdoidal suture; the largest, measuring 1.9×2.0 cm., lies in the right central half. The width between the pterions measures 10.9 cm. The left pterion is of the type "H"; however, the right pterion possesses two anomalies, one suture cutting off the sphenoid from the coronal suture, and the other running perpendicular at the posterior end of the sphenoid. The orbital borders are sharp, and the nasal aperture is narrow, with the lower borders dull and the spine medium. The palate is U-shaped with indications of synostosis of the palatine. There is a slight depression of the petrous parts below the basilar process. The styloids are diminutive. The chin of the lower jaw is rounded with marked protrusion. The wear of the teeth is marked, and ten of the fourteen teeth present show decay.

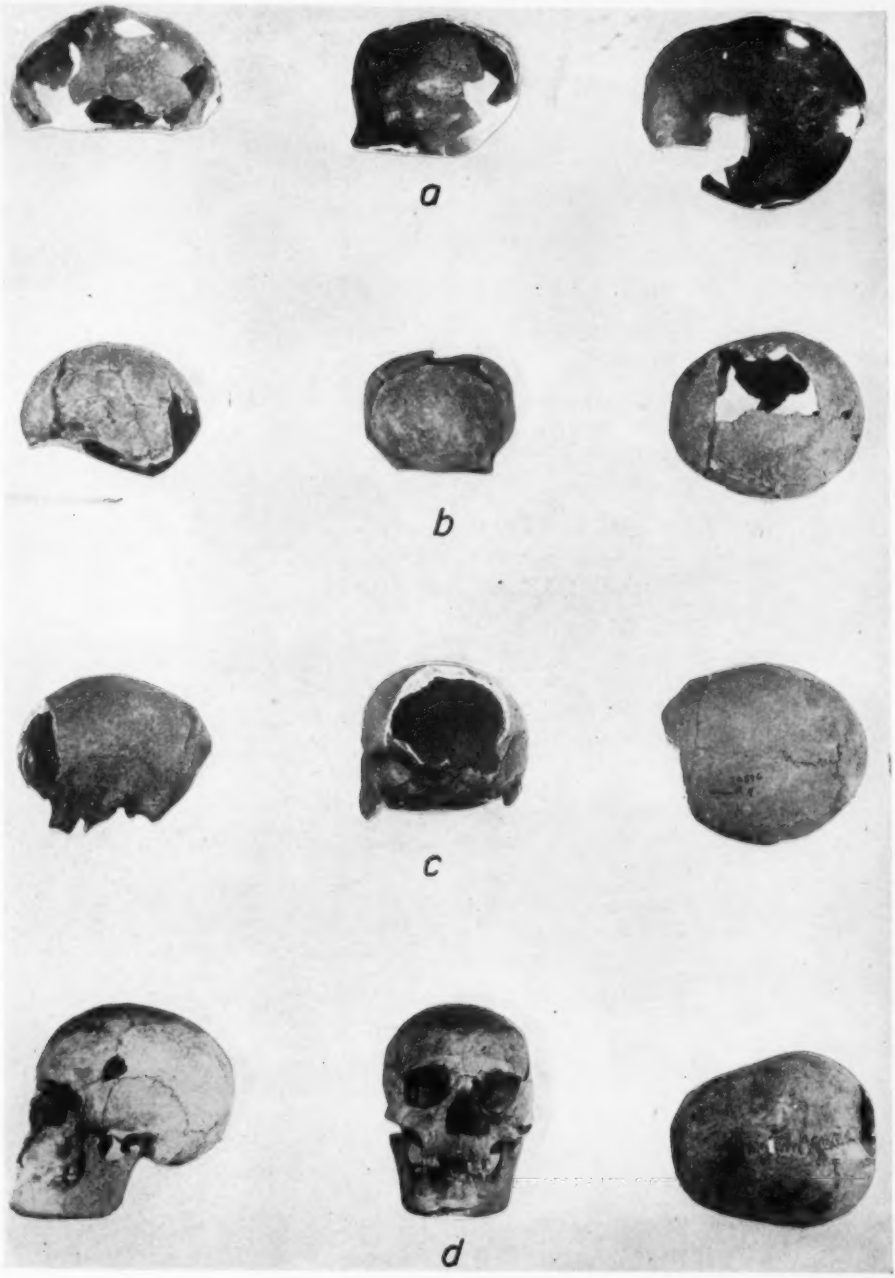
*Burial no. 8* (19039). The skull, apparently that of an adult male, is moderately low-vaulted and dolichocephalic. The vault from above is oval-long in shape. The supraorbital ridges are pronounced and masculine. The mastoids and parietal eminences are moderate. The forehead is sloping moderately with slight keeling of the sagittal region. Moderate development of the parietal eminences is noted with medium bulging of the temporals. The occiput is highly pronounced, including the inferior nuchal line; the inion is markedly developed and of the Hook type. The serration of the sutures is complex with synostosis present over-all. Pterions are of the K type, almost obliterated by the process of synostosis. The face is prognathous; the orbits are high and the borders dull with no anomalies noted; however, the nose had been fractured prior to death and had healed, with a deviation to the right. The palate is elliptical and high. The teeth wear is marked, with decay present in one of the seven teeth still intact. The general characteristics of this skull do not conform to the typical Warren physical type. In view of the knowledge that its origin is unknown, it is believed that it is Shoshonean and not associated with the Warren site.

## COMPARISONS AND CONCLUSIONS

The Warren crania have the following characteristics: cephalic index, brachycephalic; height-length index, chamaecephalic to orthocephalic; height-breadth index, tapeino-cephalic; facial index, mesene; high orbits; a fairly well-developed occipital region; and no occipital deformation.

The Warren crania were compared with other crania from known Puebloid sites in the Northern Periphery. Two of these are included in the anthropometric table (Table 10). These two, no. 11301 and no. 10861, are those mentioned by Steward and examined for him by T. D. Stewart.[11] Another cranium was found unsuitable for measurement. However, all three

[11] Steward, 1940, p. 471.




Crania from the Warren Mounds, Utah. (Catalogue numbers at the University of Utah: *a*, 20593; *b*, 20594; *c*, 20596; *d*, 18496.)

crania were examined and found to have the same general characteristics as the Warren series.

Hooton, Hrdlička, and Seltzer are in agreement as to the generally accepted hypsicephalic nature of both the dolichocephalic and the brachycephalic types of the Basketmaker-Puebloan stock.[12] This is in direct contrast to the low-vaulted Warren group. There is also a significant difference between the brachycephalic Warren crania and the dolichocephalic Shoshonean (Table 11). The broad-headed, low-vaulted features are highly distinctive, and are comparable to the crania types of Athapascan and related Northwest coast tribes, and more distantly the Mongols of Asia.[13]

The validity of using cultural and linguistic terminology in connection with physical types can be questioned. Too, the Warren series of crania is a small one and may consist of individuals from a single family line. A much larger series of such crania must be obtained before a distinct physical type can be hypothecated. And, while the Huschers have pointed out the possibility of a relationship between the migrations of the southern Athaspacans and the culture of the Northern Periphery Puebloids,[14] too little is known of this culture and its affinities apart from those with the San Juan Puebloan complexes. Until these deficiencies are corrected only suggestions can be advanced.

TABLE 11. COMPARISON OF APACHE, PUEBLOAN, AND SHOSHONEAN CRANIA*

| | *Males* | | | | *Females* | | | *Warren Cranium* no. 6 |
|---|---|---|---|---|---|---|---|---|
| | Apache (15) | Pueblo Brachyoid (19) | Pueblo Dolichoid (72–123) | Utes, Gosh-Utes (7–8) | Apache (7) | Pueblo Brachyoid (41) | Utes, Gosh-Utes (4–8) | (18496) |
| Vault: | | | | | | | | |
| Cranial index | 84.7 | 83.3 | 74.4 | 74.3 | 86.8 | 83.7 | 75.1 | 82.1 |
| Height index | 80.3 | 87.6 | 85.6 | 80.5 | 80.9 | 87.0 | 79.6 | 72.4 |
| Height-breadth index | 87.4 | 96.4 | 100.6 | — | 87.1 | 95.6 | — | 87.3 |
| Face: | | | | | | | | |
| Upper facial index | 50.9 | 52.2 | 54.6 | 52.7 | 48.3 | 53.9 | 50.9 | 51.9 |
| Orbital index | 91.5 | 92.7 | 91.0 | 86.7 | 90.1 | 93.6 | 89.9 | 84.8 |
| Nasal index | 50.4 | 51.2 | 49.1 | 47.5 | 54.5 | 52.7 | 49.6 | 47.9 |

* Hrdlička, 1931, pp. 94–5; Hrdlička, 1927.

1. The original peoples of the Northern Periphery were dissimilar, physically, from the peoples of Basketmaker-Puebloan stock and the modern Shoshonean peoples.

2. It is probable that both cultural and physical similarities may be found in the Northwest coast or the Northern Plains areas. If this should prove true, there will be possible answers to several basic questions.

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[12] Hooton, 1930; Seltzer, 1944; Hrdlička, 1931.

[13] Hrdlička, 1927, p. 78.

[14] Huscher and Huscher, 1943, pp. 81–2.

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# STONE EATING UTENSILS OF PREHISTORIC NEW ENGLAND

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WHILE much has been written concerning the aboriginal steatite (soapstone) bowl industry, it would seem that too little attention has been given to its cultural significance and the people who developed it. Whatever their traits, these stone bowl people, through initiative and persistent effort to raise their standard of living, became primitive industrialists of note. From soft steatite, which they quarried, they made stone bowls of various shapes and sizes, some of which were transported in trade to far-away regions devoid of steatite deposits.

That New England was the center from which quarry work methods spread to other localities, probably south, is the opinion held by some. However, it is not known whether the concept of utilizing the soft soapy stone for pots originated in New England. It may have started further north where steatite deposits occur with telltale pick scars of primitive workmen. Nevertheless, the existence of an abundant supply of aboriginal quarries, both large and small, throughout most of New England indicates a concentration and intensive development of the industry there. A Smithsonian report[1] gives evidence to postulate a directional movement of quarry technique from north to south through the Atlantic coastal territory, along the Alleghenies and as far south as Alabama. Even as far south as Florida, steatite sherds have occurred, but since no steatite quarry workings have been reported so far south, it must be assumed that the appearance of steatite in Florida probably resulted from trade. Any such wide spread industrial distribution as this must have required centuries to develop. It has come to have an important place in the prehistory of the country.

Who these early quarry people were, and at what age they developed their skill as stone cutters, are questions that are not easily answered, although recent excavations have done much to raise the veil. During the past six years, four steatite quarries have been excavated at divergent points in New England: two in the Connecticut Valley at Westfield and Wilbraham, Massachusetts; one at Cranston, Rhode Island; and another near Worcester, Massachusetts. Previously, many others throughout New England had been opened and

* All illustrations are by the author.

[1] Bushnell, 1939, p. 473.

their tools and ware recovered. At about the same time, several graves in which steatite bowls appeared were exhumed in and about Holyoke, Massachusetts. The significance of this mortuary material is that it includes no clay pottery or agricultural tools. Furthermore, no complete steatite bowls occur in other mortuary discoveries, where artifacts denoting ceramic arts and agricultural pursuits are in evidence.

Early historical writers, except one, are silent on the aboriginal use of stone for eating utensils. A Swedish scientist, Peter Kahm, mentioned them in 1772, describing customs in New Jersey.[2] However, his statements are second-hand and they tell only what the oldest Swedes could remember, that they saw Indians boil their meat in greenish, and sometimes grey, pot-stone pots. His impression seems to be that the same Indians made the bowls although his statements are not authenticated.

It is possible that a certain group of New Jersey Indians continued during prehistoric times to make and use the steatite pottery which had been developed by their ancestors centuries before. However, it is probable that the manufacture, if not the use, of stone pots had ceased in all parts of New England years before the arrival of the first white explorers. Furthermore, mortuary remains suggest that the stone bowl industry in New England flourished and died before the introduction of ceramics and agriculture although it is entirely possible that the use of such stone bowls as remained unbroken continued into agricultural times and served to supplement clay pots which were then in general use throughout the area.

The antiquity of the stone bowl era, together with the apparent originality displayed in the styling and making of utensils, has been an impelling force toward new discoveries. These will be referred to in their proper place, but at the start it is important to remember that the stone bowl people were a group of savages, who by a lucky stroke and a desire to improve their living conditions, ushered in a new industrial era.

Their heritage was no doubt that of a food-gathering economy with the use of stone, wood, and bone implements. Food was probably cooked and eaten with the rudest sort of utensils, such as large shells, split bones, sticks, and stone knives. Possibly there were no kettle substitutes for cooking leftover food, or dishes in which to serve it. Whatever was the economic status of their predecessors, it is certain that ingenuity, if present at all, had failed to establish a stone-cutting industry like that which followed.

Suddenly, chance discovery of a soft soapy stone (steatite), usually found in large outcroppings or boulder deposits, gave them a workable material for hollowing and started them off toward a new industry. At first, with labored efforts, they probably cut out stone vessels with rude stone picks made from the harder rocks in the locality. Then, as their experience developed, they produced finer and more diversified pieces of stoneware with well-made specialized tools. By then they had embarked on a course of cultural achievement which apparently lasted for several centuries. No evidence has been found to suggest the reason for its final collapse. However, the collapse might have been due to the subsequent introduction of ceramics, providing lighter vessels which could be more easily moulded into any shape. With the spread of clay pottery-making, the art of cutting vessels from stone was probably soon forgotten, although in some localities the two industries may have continued together for some time. Centuries have passed by and today many of the old stone quarries have been uncovered. New light has been thrown on the stone bowl industry by the appearance of additional evidence. Generally speaking, it now appears as an important industrial development between savagery and the advanced cultural stage of protohistoric times. It ushered in a long era of industrial cooperation when people labored together to supply their families with more efficient and sanitary eating utensils.

## STONE SOURCES

Steatite, or soapstone as it is popularly known, was the stone that more than any other served the aborigines best for various shaped vessels. It occurs in fairly large deposits in Newfoundland, New Brunswick, and in many places in New England, thence through the Appalachian highlands and south through Virginia and into the Gulf States. Deposits also occur in Wyoming and other states along the Great Divide and in California, where a big deposit in Pots Valley on Santa Catalina Island furnished much of the material used by the people on the mainland. Some of the deposits in the Berkshire Hills of New England apparently were never worked by the aborigines.

[2] Kahm, 1772, Vol. 1, pp. 343–4.

Preference seems to have been shown for those adjacent to habitation sites lying in river valleys or elsewhere, where transportation of heavy stone loads would have been less of a problem.

Two quarries in western Massachusetts have been extensively excavated under the direction of the author, and material from them serves as the basis for some of the conclusions reached. At Wilbraham the deposit is in the form of glacial boulders brought down from escarpments in Swift River valley and deposited in a concentrated area in geologic ages. Most of these boulders have now disappeared, having been cut away for pots. Large circular depressions or craters occupy the spots where the boulders once stood (Fig. 13). Recent excavations have been extensive in craters 1 and 2, and to a lesser degree in crater 4.

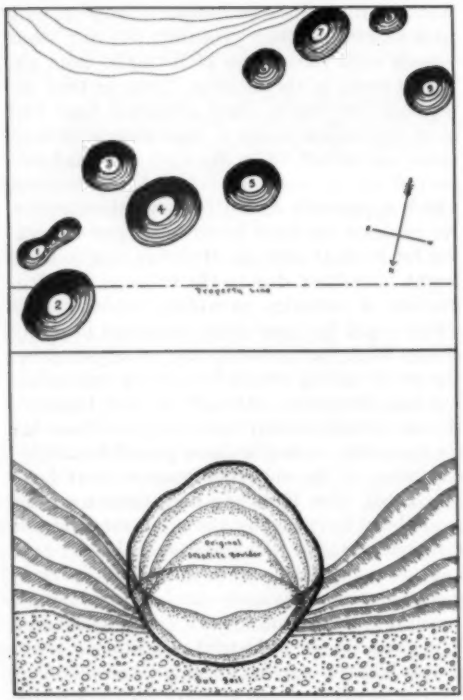


FIG. 13. Wilbraham steatite quarry, showing location of man-made craters and method in which they were made.

The other quarry at Westfield, while nearly destroyed by a recent serpentine-marble quarry, still has one vein of steatite exposed with several pot-forms half completed on its surface. The workshop, which was considerably disturbed, has been extensively excavated with satisfactory results. However, that which has proved to be of perhaps the most significance is a quartz tool quarry and workshop only about 200 yards distant. Excavations at this site have revealed a storehouse containing nine different types of tools, which have recently been classified.[3]

Among other excavated steatite quarries in New England are the following: Ochee Quarry, near Providence, Rhode Island, and Bristol Quarry at Bristol, Connecticut, reported by F. W. Putman;[4] Dolly Bond Quarry near Worcester, Massachusetts, reported by R. P. Bullen;[5] Worked Out Quarry near New Hartford, Connecticut, reported by E. H. Rogers;[6] Burbank Hill Quarry at Bramanville, and Eight Lots Quarry of Sutton, both in Massachusetts, reported by C. C. Ferguson;[7] and Oaklawn Quarry near Cranston, Rhode Island, reported by G. C. Dunn.[8]

The method of cutting and removing pot-forms in New England, was apparently the same as that at Pots Valley, Santa Catalina Island, reported by Paul Schumacher. With large quarry picks, which were sometimes hafted, the blank to be removed was encircled with a groove. This groove was deepened to the desired depth, and the blank then undercut until it was split from the vein or boulder. Then followed the shaping of the blank, which was only roughed out and partially finished at the quarry. The final finishing was probably completed at some distant camp site. Recent evidence, however, suggests that at least some of the final finishing was accomplished at the quarry, thus making the outward load lighter.

Steatite was not the only stone used for eating utensils, and a brief summary of other stones will serve to show the extent of diversification. Knives of quartz, quartzite, felsite, flint, chert, indurated clay, and basalt were generally used for eating. They were obtained from glacial drift or escarpment deposits and sometimes through trade. For plates, granite was

[3] Fowler, 1944, pp. 97–100.
[4] Putnam, 1878.
[5] Bullen, 1940.
[6] Rogers, personal communication.
[7] Ferguson, personal communication.
[8] Dunn, 1945.

preferred, as it frequently occurs with more or less flat faces. Other flat stones of a durable nature such as limestone schist which occurs in abundance at Westfield, were also used for the same purpose.

### STONE CUTTING TOOLS[9]

Whenever a new industry is born there is inevitably a so-called tooling period, and this was just as true in the stone age as now. When soft steatite was discovered, the first problem was, what kind of tools would cut it best. Apparently, hard, pointed stones seem to have been the preferred choice for all working. These picks at first were probably but rude implements held in the hand. However, in time, smaller varied tools displaying a sense of refinement were made, and efficiency in some cases was increased by hafting. This improved tooling seems to have been carried further at some quarries than at others, or else the smaller specialized tools that occur in western Massachusetts have been overlooked by most excavators in other localities. Extracts from reports concerning several quarries will serve to show this conspicuous omission.

*Ochee Quarry, Rhode Island.* "A careful estimate of the number convinces me that at least 2000 of these rude stone chisels had been found on the ledge or in the immediate vicinity. They were all of nearly the same size, rudely chipped to a blunt point at one end, and roughly rounded to fit the hand at the other . . . 5–8½ inches in length and 1–4 lbs. in weight."[10]

*Connecticut Ave. Quarry, District of Columbia.* "A majority are those tools improvised on the site, and are, as a rule, quite rude . . . derived from quartz veins and boulder beds in the vicinity. Specimens approach a paleclithic type . . . . Nothing more primitive is possible."[11]

*Dolly Bond Quarry, Massachusetts.* "Picks vary from ¼–2¼ lbs. and 3–5½ inches in length of quartzite, . . . all apparently hand picks, . . . all crudely sharpened to a point by the removal of large flakes . . . . Twenty scrapers, 3 inches long, roughly triangular with curved edges . . . ."[12]

*Oaklawn Quarry, Rhode Island.* "Nothing found to correspond with picks from other quarries except pieces of gneiss, which may have been used as picks. They fit the hand well . . . no working."[13]

In spite of such reports, which seem to be more or less the same from all quarries, recently excavated evidence from Wilbraham and Westfield sites of western Massachusetts shows a definite specialization in tools with the appearance of new shapes. Possibly, the existence of these new tools would have been completely overlooked had it not been for the Westfield tool quarry discovery. Guided by the different tool forms found there, similar types, in many cases identical in shape, were revealed at Wilbraham. Usually, they are carefully re-worked to set patterns. Such diversified tooling suggests a highly developed stone-cutting technique, such as has not been postulated in the past. Whether this was more or less a universal accomplishment throughout the quarry workshops cannot be verified for lack of excavated evidence. Nevertheless, in western Massachusetts the occurrence of quantities of specialized tools seems to indicate a high industrial efficiency.

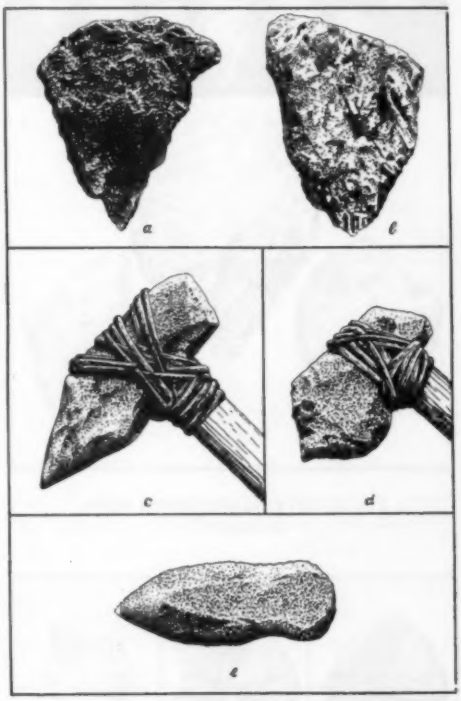


FIG. 14. Quarry end picks: *a*, *b*, for hand use, Westfield; *c*, *d*, probable method hafting, Wilbraham; *e*, full grooved with ground point, Wilbraham (¼).

[9] Nearly all the illustrated specimens are in the Museum of Natural History, Springfield, Massachusetts.

[10] Putnam, 1878, Vol. 2, pp. 274–6.

[11] Holmes, 1893, p. 120.

[12] Bullen, 1940, pp. 17–18.

[13] Dunn, 1945, p. 50.

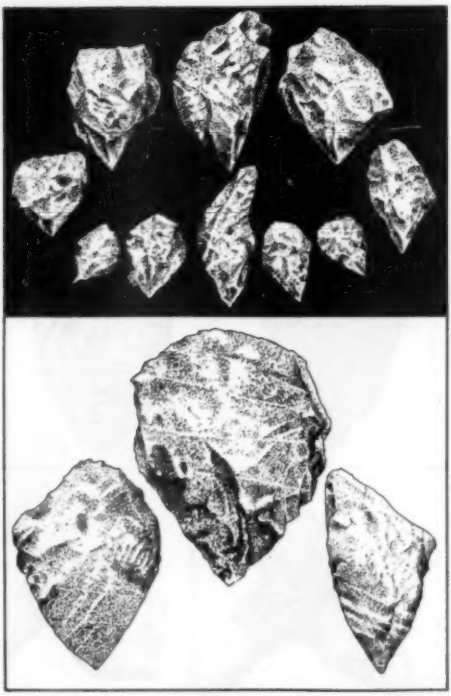

FIG. 15. End picks of crystalline quartz, Westfield (½).

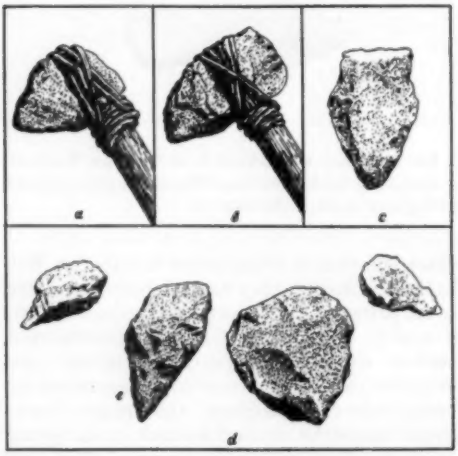


FIG. 16. End picks, Wilbraham: *a*, tomahawk, suggested haft, probably not a pick; *b*, small, notched pick, suggested haft; *c*, small notched pick; *d*, small hand picks (½).

Before attempting to describe the various tool forms, attention should be called to an operating practice common to almost all steatite quarries. Most reports refer to the appearance of grooved axes, many of which have been worn down or flaked to a rough point. These, together with rudely flaked axes and mauls were probably hafted and used to cut away undersirable masses of stone. Apparently one stage in quarrying belonged to an age when grooved axes were in general use, and might denote a migratory association with Mississippi valley cultures where similar axes appear.

*End picks* (Figs. 14–16). Probably the first tool conceived was a pick made from a roughly pointed stone. To judge from the large quantities occurring at all quarries, this was universally accepted. Such picks have one end percussion-flaked into a point, the other frequently rounded as if to fit the hand. In addition, when designed for hafting the base is notched on opposite sides by chipping. The balance is such as to suggest a haft with the handle extending from the side like an ax, not from the face like an adz. Occasionally, such notches have been pecked into a wide groove encircling the base, denoting association with full grooved axes. Usually in such cases, the pointed end has been abraded (Fig. 14, *e*). Such well-worked picks as these, frequently made of basalt, were probably manufactured at camp sites and carried to and from the quarries. In general, quarry reports mention no picks smaller than about 3 inches in length, with a large majority having a much greater length. In western Massachusetts, however, more diversification in size is apparent. Here occur at least four different sizes, whose respective weights seem to determine their classification.

*Three to five pounds.* This group contains large quarry picks that were sometimes hafted. They were probably used to remove pot-forms from the mother stone (Fig. 14).

*One and one-half pounds.* This class includes some picks intended for hafting, but mostly those designed for hand use. They were probably used for shaping the exterior of larger vessels, as well as for extending the hollowing to a point where the danger of fracture necessitated the use of other tools.

*One-half pound.* In this group are a few picks, weighing ¾–1 pound, which are notched for hafting. However, the rest of about ½ pound in weight have their bases rounded as if for hand use. They would have been useful for commencing the hollowing of smaller vessels and shaping their handles or lugs.

*One ounce.* These tiny picks, about 1 inch in length, have occurred only at Westfield. Besides those which were scattered around the site, a cache of fourteen was found at the adjacent quartz tool workshop, apparently a stock supply.[14] These small quartz picks may have been used to shape extremely small vessels.

End picks were easy tools to operate and therefore popular. They had one disadvantage in that their direct thrust frequently caused breakage along seams in the stone, unless carefully handled. This may account for the great variety of weights, which were probably required safely to cut different sized vessels.

*Corner picks* (Fig. 17, *b*, *c*). These are a variation of end picks and probably served the same purpose. The pick point, instead of being at one end, is formed at one or more of the corners of a rectangular stone block. Thus, the tool may have a maximum of four points, but usually has only one. Its shape is such that it must be held in the hand with the working point at the top. Therefore, to bring the point into action requires the action of the wrist. In this way the thrust may be better controlled, and is less likely to cause fracture. It seems obvious that these tools were designed after such a procedure had become known, and that it required no great diversification in weight. Usually they have a weight of about ½ pound.

*Chisels.* These tools are much the same as large end picks except that their blades are chipped to a narrow sharpened edge, chisel-like in shape. Some sites have more of them than others; nevertheless, they were apparently in quite general use. They were sometimes employed for trimming the exterior of large vessels, but probably seldom, if ever, the interior. A small variation of the chisel has occurred at Wilbraham. It is made of white quartz and, instead of a straight blade, has one like that of a scoop chisel. It measures 1½ by 3 by ¾ inches. One end graduates to a thin, sharp-edged concave blade, while the other is enlarged and rounded as if intended for a finger grip. Although this may be one of a specialized tool group yet to be classified, at present it appears only as the design of one man.

*Scraping chisels* (Fig. 17,*a*). These small tools are of crystaline quartz and have occurred only at the Westfield site. They are ingenious implements, apparently intended for scraping, and measure about ½ by 2 by ½ inches. One end has more or less rounded edges to form the handle, while the other is abruptly beveled to a sharp chisel edge. They were probably designed for scraping the walls of small vessels to reduce them in thickness during the process of hollowing.

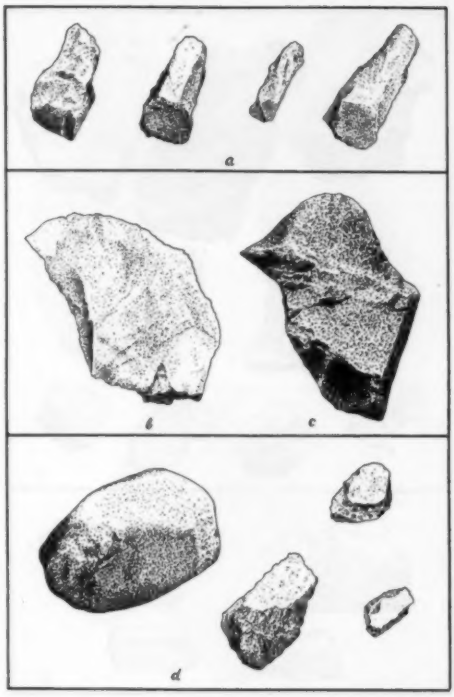


FIG. 17. Tools: *a*, scraping chisels, Westfield; *b*, corner pick, Westfield; *c*, corner pick and gouge, Wilbraham; *d*, hammerstones (¼).

*Gouges* (Fig. 18,*a*). These tools were apparently in use at both the Wilbraham and Westfield quarries. They are of various sizes, intended for hand use, and have a semicircular blade with a radius of ¼–½ inch. The circular edge is sharp, and may be used to gouge out the ends of vessel cavities. Invaluable in the final work of hollowing, gouges were probably considered by experienced workmen as essential as picks, especially in the making of smaller vessels.

*Abraders* (Fig. 19). In this group of implements are two types of abraders. One has a prominent handle at one end, while at the other the stone is wider for abrading. This handled abrader varies in length from 3–7 inches.

[14] Fowler, 1944, p. 99.

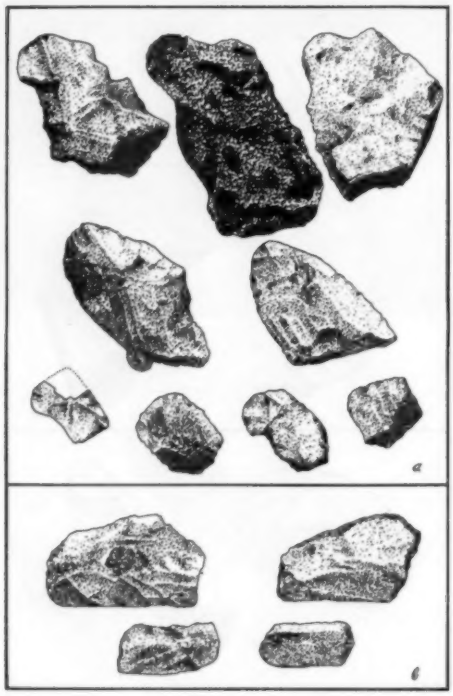

FIG. 18. Tools, Westfield: *a*, gouges; *b*, shavers (½).

Longer handles were probably designed to reach the bottom of deep vessels, while shorter ones were for shallower bowls. The second type, the rocker abrader, has a semicircular blade with a thickness of about 1 inch and a length of 2½ inches. This tool was probably used to wear away rough surfaces by a dragging rocker motion.

*Abrading scrapers* (Fig. 20,*d*). These tools are similar to rocker abraders except they are thinner and taper to a thin, rough edge. Therefore, in operation they become a scraper as well as an abrader. They were probably used with a sawing motion for excavating the interiors of vessels.[15] This tool type is in great evidence at Worcester and in western Massachusetts and probably was used to a considerable extent. Sometimes the bases of these scrapers are notched as if for hafting, but usually they are rounded for use without a handle.

[15] Bullen, 1940, p. 18.

*Shavers* (Fig. 18, *b*). These unique tools appear only at Westfield. They are always made of crystalline quartz from the adjoining tool quarry and occur in small as well as large sizes, ½–3 inches in length. They have one straight edge, beveled to razor sharpness, one end of which is rounded. Simple as they may seem, these shavers were probably used to shave the vessel walls from within the cavity. In this way the walls could be reduced to thin proportions without danger of breakage. The rounded

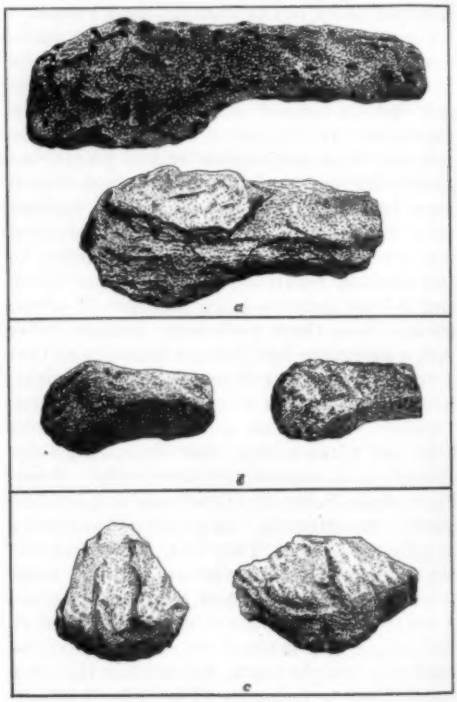

FIG. 19. Shaped abraders: *a*, handle type, Westfield; *b*, handle type, Wilbraham; *c*, rocker type, Westfield (½).

corner of the razor blades seems to have been made to prevent an unwanted groove, which would have been formed at the base of the cavity had the point not been removed. These efficient tools would probably go unnoticed in general deposits had they not been discovered in association with stone bowl manufacturing.

*Bit.* (Fig. 20, *b*, *c*). This implement has perhaps the rarest design of any tool. The only one of its kind at the Westfield tool quarry, it ex-

hibits traits that give it the appearance of a stone bit. It consists of a small, flat crystalline quartz block about 1½ by 2½ inches. At one end a semicircular blade has been percussion-flaked with a bevel from one edge to the center of the convexity and a reverse bevel from there to the other edge. When twisted counter-clockwise in a block of steatite, it bores a hole with a diameter of about 1½ inches. It appeared at the top of the tool quarry tailings *in situ*, and may therefore be considered a manifestation of the last occupation of the site. It represents a signal accomplishment at the end of probably a long period of tool-making. One wonders what effect such a useful implement for hollowing would have had on the steatite industry had it been developed at the start rather than at the termination of operations.

*Hammerstones* (Fig. 17, *d*). These stones occur at all quarries and are sufficient evidence to show that all tools were probably shaped by percussion-flaking. In the illustration, besides the large stone, appear three small hammerstones of crystalline quartz from the Westfield tool site. As several of these small hammers were found in cache 2 with fourteen 1-ounce end picks, it is clear that for shaping small tools like this, correspondingly small hammerstones were required. Here again, tool weight appears to have been an essential consideration in obtaining good results.

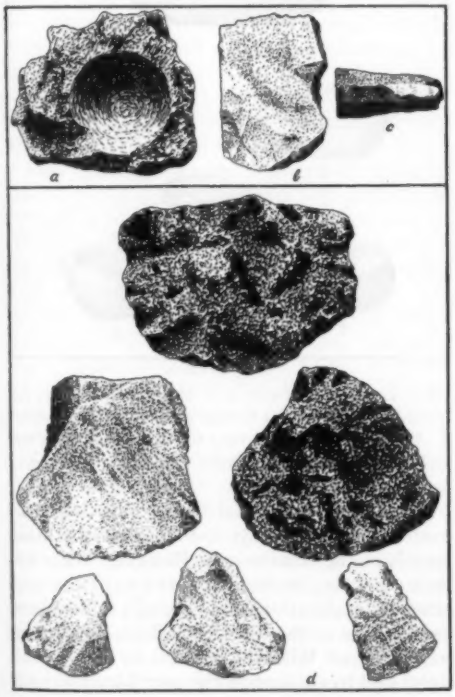


FIG. 20. Tools, Westfield: *a*, steatite with excavation made by bit (*b*); *b*, bit; *c*, end view of bit; *d*, abrading scrapers (¼).

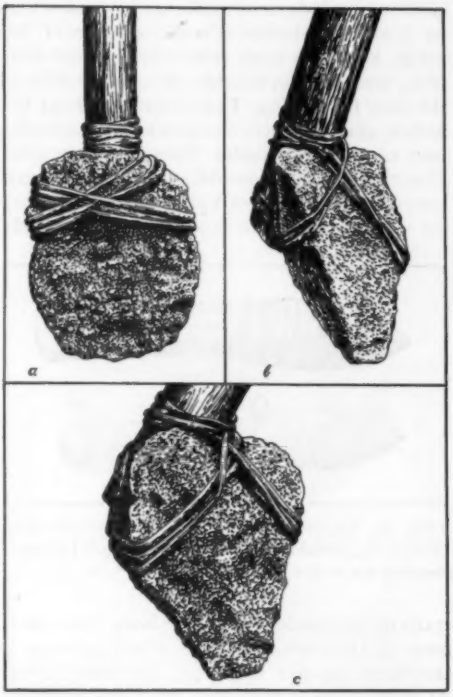


FIG. 21. Tailing removal tools, Wilbraham, showing probable method of hafting: *a*, spade; *b*, *c*, tailing breakers (about ¼).

*Polishers*. At Westfield, many fragments of steatite appear to have been used for polishing, in that they show surface rubbing. They suggest that some stone bowls, at least, received their final finishing at the quarry. Several finished bowl fragments from the Wilbraham site give further evidence of this.

*Tailing removal tools* (Fig. 21). Finally, the presence at the quarries of western Massachusetts of implements with traits that would seem to fit them best for tailing removal work sug-

gests a new industrial phase to be commented on in the Conclusion. These tools are of two kinds. Some are oval, relatively flat and thin, with, occasionally, notches on opposite sides of the base for hafting. Their length is about 6–7 inches, and they have the appearance of having been employed as spades. Then there is another kind that closely resembles stone agricultural hoes of the Connecticut Valley.[16] However, they are usually larger and heavier but with all the

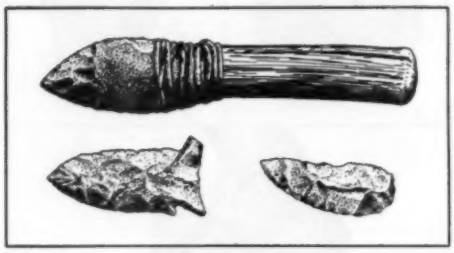

FIG. 22. Knives, Connecticut valley habitation sites. Three styles, probably used in eating; suggested haft completed by the author with stone tools.

traits of the smaller cultivating hoes. Two specimens of the triangular type, which perhaps is the most popular style, are illustrated (Fig. 20, *b*, *c*) from Wilbraham; they are carefully flaked and are made of granite. It is probable that these hoe-shaped blades were used as tailing breakers to loosen the hard-trodden steatite dust, while the stone spades were employed to shovel it into baskets for deposit on waste mounds surrounding the steatite deposits.

### STONE EATING UTENSILS[17]

While steatite was the chief stone from which various sized vessels were hollowed, other materials were occasionally employed both at the quarries and at habitation sites. That most vessels were made expressly for eating purposes is now a general concept. Encrustation of carbon on the outside of some large pots suggests their use as kettles over open fires and leaves little chance for doubt. Smaller vessels found in close association with the large may also have been used for eating purposes, especially as some of their shapes are obviously designed for holding food.

[16] Fowler, 1945, pp. 31–5.

[17] Nearly all the illustrated specimens are in the Museum of Natural History, Springfield, Massachusetts.

*Eating knives* (Fig. 22). Before describing vessel utensils, it is important to note that the chief stone implements used for eating were knives. As illustrated, there are at least two basic styles: notched and stem. In general these knives are comparatively small, having a length of $1\frac{1}{2}$–2 inches. They probably had handles of bone, horn, or wood, for their well-shaped shanks are obviously designed for hafting. The hafted specimen illustrated has a stem form. It was hafted by the author entirely with the aid of stone woodworking tools. Most of the best knives are made of flint or chert, although the earlier ones in western Massachusetts are usually of quartz, quartzite, or basalt.

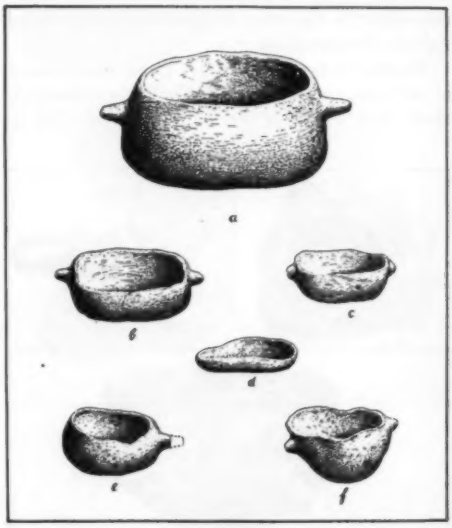


FIG. 23. Steatite vessels: *a*, *d*, Massachusetts; *b*, *c*, *e*, *f*, Connecticut. *a*, Amherst College museum; *b*, *c*, *e*, Edward H. Rogers collection, Devon, Connecticut; *d*, Harvard Peabody Museum; *f*, Yale Peabody Museum (about $\frac{1}{4}$).

*Bowls.* This term and "pot" have been the names most commonly used to describe stone vessels of the steatite age. However, there has been a growing tendency to get away from such general classifications and to assign a functional use to some of the bowl variations. The recent recoveries at Wilbraham seem to justify this trend and to emphasize the need for additional utensil classification. However, there are certain vessels which may best be termed "bowls" as they probably were used as storage receptacles. Their length varies from 5–12 inches, with

a cavity depth of from 2–4 inches. Their shape is usually somewhat oval, though often with square-shouldered ends. Lug projections are symmetrically placed, one at each end (Fig. 23, *b*, *c*, *f*).

While the specimens illustrated are finished bowls from habitation sites, more may be learned from fragmentary material appearing at quarry sites. Such broken specimens represent a cross sectional record of the entire industry. Obviously, most perfect vessels have been removed. However, fragments of bowls usually incomplete, though well formed, may sometimes be restored to illustrate the intended form. A Wilbraham restoration (Fig. 24, *a*) shows a small bowl with a distinctive design at each end. Instead of the usual lugs, this vessel has stepped-off wall elevations resembling the poop of an ancient square-rigger. Here originality asserted itself and broke the bounds of traditional lug designing. Occasionally, a pecked decorative border encircles the outside edge of large vessels, while sometimes rim edges are notched. These crude attempts at display may have influenced ceramic decorations of a later period.

*Kettles* (Fig. 23, *a*). Large bowls having a length of 15–21 inches with a relatively deep cavity were probably used as kettles and suspended over open fires. They undoubtedly served as cooking pots with capacities large enough to supply entire families with soup or stew. The illustrated specimen has a length of about 18 inches. It is a mortuary recovery from Hadley, Massachusetts. Probably the largest stone kettle in existence is in the collection of Norris Bull, West Hartford, Connecticut. It measures about 21 inches long, 11 inches wide, and has an unusual depth of 14 inches. This authentic specimen is from a Connecticut habitation site at Westbrook.

At Wilbraham, there appeared *in situ* an unfinished kettle covered with 3 feet of tailings. Its length is 16 inches and its weight about 75 pounds (Fig. 25, *b*). Apparently, it had not been rejected, but rather had been abandoned by some workman who had never returned to complete it. It was resting on a horizontal plane, right side up, as if in a position for further cutting. Its well-shaped exterior had been entirely shaped with a straight edged chisel having a $\frac{3}{4}$ inch blade. The hollowing of its interior had proceeded to about an inch in depth the work done with a sharp pointed pick, probably similar to the illustration (Fig. 16, *e*). This pick was discovered nearby at about the same depth and may have been the actual tool that was used. A completed kettle of about this size was a surface find at the same site, and is known as the Chapin bowl. It has two lugs, is 15 inches long by $6\frac{1}{2}$ inches deep, and is well shaped. Such vessels evidently represent the acme of the stone cutter's art, and indicate with what persistent effort this industry was carried on during the long period of its existence.

*Plates* (Fig. 26). Apparently, there was a need for stone plates, probably to provide a cleaner place than the ground on which to rest portions of meat while eating. Flat or slightly concave granite slabs, 6–7 inches in length, are found at camp sites in the Connecticut Valley. They are generally somewhat oval, well shaped with all edges rounded, and have the appearance of plates. At Wilbraham there is evidence to show that plates were fashioned from stea-

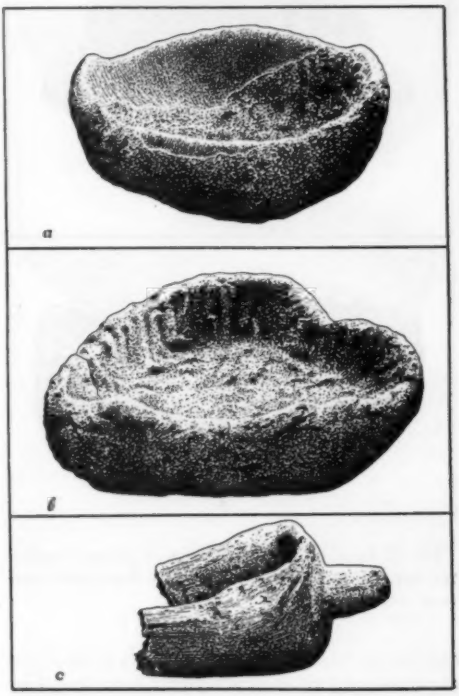


FIG. 24. Steatite vessels, Wilbraham: *a*, storage bowl with styled ends, partly finished, restored; *b*, dish, roughed out; *c*, finished sherd with square shoulders ($\frac{1}{4}$).

tite. A most convincing proof that such utensils were an important product of the industry comes from Westfield. Limestone schist, which splits along flat-faced seams, was used there. This stone seems to have been shaped into flat plates, each with a pointed handle at one end (Fig. 25, *a*, *b*). One plate found on the surface is of granite, however, and has a shallow cavity,

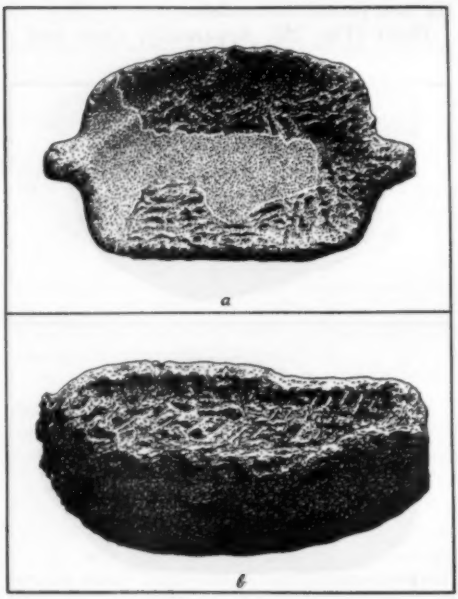


FIG. 25. Steatite objects, Wilbraham: *a*, platter, roughed out, restored; *b*, large bowl-form, partly shaped and excavated (about $\frac{1}{5}$).

roughly pecked out (Fig. 25, *c*). This evident use of plates is by no means the first instance of an eating custom where plates were required. As far back as the end of the ice age in Europe, mammoth hunters at Vestonice, Czechoslovakia, used stone plates when eating roasted meat, as reported by Dr. Absolon of that country.

*Dishes* (Fig. 24, *b*). The specimen illustrated was probably used for eating. It was found at Wilbraham in two fragments and is finished to some extent on the outside but not within. Sometimes such vessels are larger, but usually not exceeding a maximum length of 7–8 inches, (Fig. 23, *d*). It seems probable that the stone bowl era established the use of individual dishes. That the custom may have been perpetuated over the centuries is likely, for in 1610 Champlain wrote concerning the Hurons of Canada: "Indians came to the feast each bringing his wooden bowl and his spoon."[18] Whether in wood or stone, the important fact is that aborigines had learned to use dishes (shallow bowls) as eating utensils. Apparently, early stone dishes had no style or symmetry. Instead, they followed the general outlines of the stone blank from which they were cut, without the usual ornamental lugs. Possibly such handles obstructed the normal use of dishes and were eliminated for this reason.

*Platters* (Fig. 25, *a*). While excavating craters 1 and 2 at Wilbraham, several interesting steatite fragments turned up. They appeared to be segments of large dishes which had been slightly hollowed, and suggested platters. One

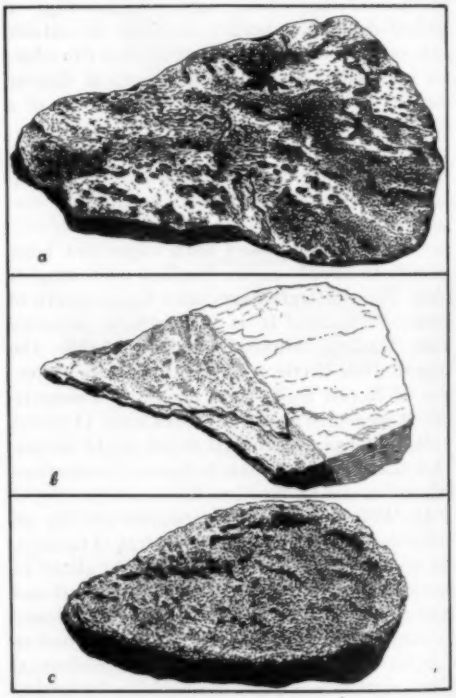


FIG. 26. Plates, Westfield: *a*, plate-form; *b*, plate restoration from fractured handle; *c*, plate, slightly hollowed ($\frac{1}{3}$).

[18] Champlain, Vol. 2, p. 23.

specimen had been finished smooth on its exterior; none gave evidence of the existence of lugs. Research was continuing when the fine specimen illustrated was recovered in four fragments, widely separated. While only one end is complete, enough of both sides remain to permit a projection of the opposite end. That this platter had a lug is probable, as nearly all large vessels were provided with a lug at each end to facilitate handling. Restoration of the platter was made on this basis.

Here is proof that the stone bowl people had found a need for platters, and had created a design not uncommon in the metal platters of today. While this specimen is only roughed out with a pick, the work is so skilfully done that its intended form is as unmistakably clear as though it were completely finished. This specimen, with others, suggests that for all large vessels and most medium-sized ones, the roughing out of the shape was usually carried to an advanced stage with picks of various sizes.

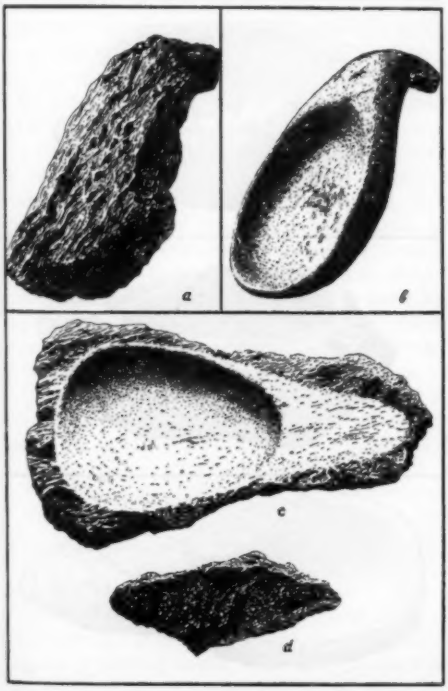


FIG. 27. Steatite ladles, Westfield: *a*, ladle-form; *b*, ladle made from (*a*) by author with stone tools; *c*, *d*, form with suggested ladle shape (½).

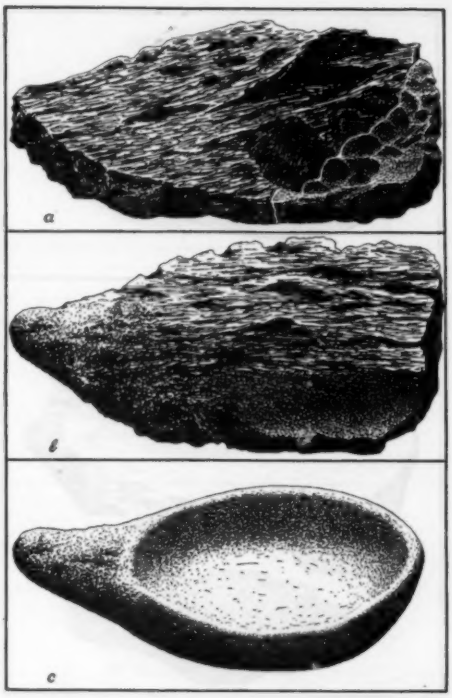


FIG. 28. Steatite cups, Westfield: *a*, restored cup-form; *b*, cup-form with handle formed; *c*, cup made from (*b*) by author with stone tools (about ½).

Indeed, the preference for this common tool and its use beyond a point of caution, probably accounted for a large majority of all vessel fractures.

*Ladles* (Figs. 23, *e*; 27; 30, *c*). Utensils of various sizes, probably used as serving dippers, have been reported from nearly all steatite quarries. Illustrated is a small long-handled ladle, partly roughed out, from Wilbraham and a deep medium-sized one, finished, from a habitation site at Cornwall, Connecticut. The bowls of ladles are usually either shallow or quite deep, depending upon their use. An outstanding trait, which typifies all ladles, is an extended handle limited to one end of the vessel. In cases where the bowl is small (Fig. 30, *c*), the ladle assumes the proportions of a modern spoon, but probably was not used for individual eating purposes. At Westfield several shallow ladle-forms, one with a hooked handle (Fig. 27), give evidence that spoon-shaped vessels were contemplated. Also, from California comes a

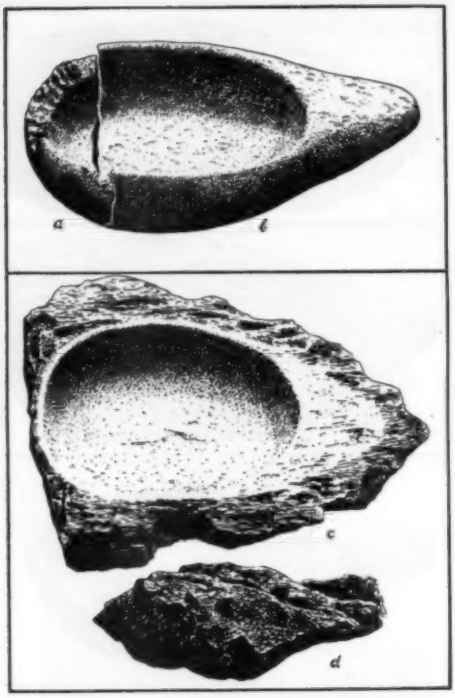


FIG. 29. Steatite cups: *a*, steatite cup-sherd, Agawam; *b*, restoration showing probable shape; *c*, cup-form with suggested cup-shape, Westfield; *d*, cup-form, end view (½).

report, written in the latter part of the nineteenth century, which bears closely on this subject:

> Mr. Paul Schumacher at Santa Catalina Island at the steatite quarry in Pots Valley found a very small dipper, spoon-like in shape. It had a short bluntly pointed handle of about an inch in length projecting from the bowl portion, which is about 2½ inches long by slightly more than one inch in width and an interior depth of ½ inch. The thickness of the bowl is not over ¼ inch. The shape of the handle is such as to convey the impression that it was inserted into a longer one of wood.[19]

*Cups* (Figs. 28; 29; 30, *a*, *b*; 31). These specimens provide perhaps the most controversial question that has arisen from recent quarry excavating. Can these relatively small one-handled vessels, fragments of which have appeared more often than those of other vessel forms at both quarries of western Massachusetts, be considered cups? That they were a major part of the steatite industry in these quarries is evident from the large deposit of fragments. Furthermore, their shape is such as to justify a postulation of cups, although there apparently is a variation in handle styles between the two sites. While no roughed-out or finished specimens are in evidence at Westfield, many cup-forms appear there in various stages of development

With few exceptions, these forms are squared off at one end with the opposite end roughly pointed. That a vessel with but one handle was the probable concept seems obvious. Their length varies from 5–8 inches. In the case of one specimen, the hollowing of the bowl has been begun, while on another the handle has been pecked into shape (Fig. 28). Figure 28, *c* shows the Westfield cup as it might have looked after having been cut from this form with stone tools. Further evidence that cups of this shape were in use comes from a cup frag-

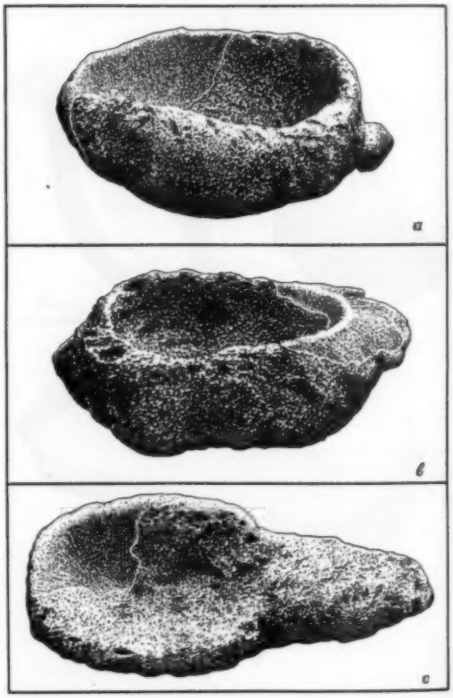


FIG. 30. Steatite vessels, restored, Wilbraham: *a*, cup partly finished; *b*, cup roughed out; *c*, ladle roughed out (½).

[19] U. S. Geographical Surveys, 1879, Vol. 8.

ment found on the surface of a large habitation site in Agawam, just south of the mouth of the Westfield River (Fig. 29, *a*). As the stone is unquestionably Westfield steatite, restoration has been made and is illustrated (Fig. 29, *b*). This follows Westfield cup shapes as suggested by cup-forms from that quarry. While these postulated cups, probably with extended handles, somewhat resemble ladles, their projected cavity would usually equal that of a half tumbler, making them more suitable for use as individual feeding cups. However, some of the larger examples, as well as shallow long-handled ones, were probably designed for ladles.

Additional material to support the postulated cup concept comes from Wilbraham. Fortunately, various manufacturing stages are represented at this site. Figure 31, *c* shows a small cup-form with a lug just appearing. Figure 31, *b* is a cup-form with a lug showing and the exterior partly shaped and smoothed. This was a surface find about 25 feet from specimen *a* which appeared at a 2-foot depth in crater 4. This specimen was completely roughed out by pick. The drinking edge had evidently fractured when the stone cutter attempted to make the wall thinner. Two other specimens from crater 2 tend to show that Wilbraham cups, unlike those from Westfield, have short lugs for handles (Fig. 30, *a*, *b*). Specimen *b* is hollowed with an incipient handle, while *a* is partly finished with its handle well shaped and smoothed. This specimen lent itself readily to restoration, as shown in the illustration. It displays all essential cup traits from this site: circular shape, cavity with capacity of about half a tumbler, and a short lug for a handle. Cups at this quarry seem to differ most from ladles in their circular form and short handles. While both kinds of vessels may have been used interchangeably at times, their differing traits suggest divergent uses.

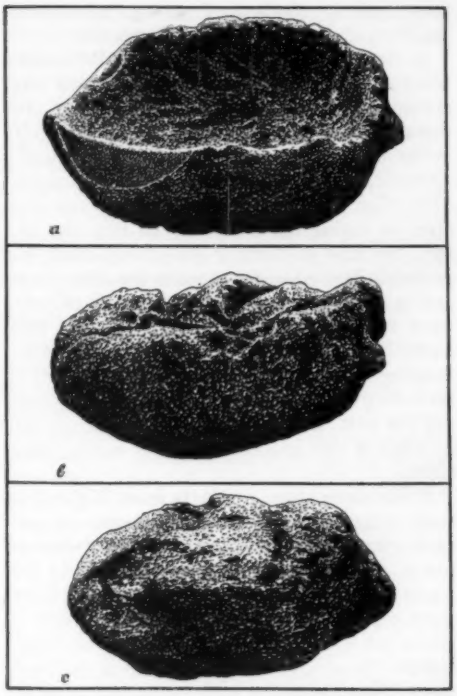


FIG. 31. Steatite cups, Wilbraham: *a*, cup roughed out, restored; *b*, cup-form with lug shaped; *c*, cup-form (½).

## SUMMARY AND CONCLUSION

No one who has been associated with the excavation of steatite vessels at quarries doubts the existence, at some time in the early development of New England, of a well defined industrial stage during which the production of stone eating utensils was of major importance. Generally termed bowls, the stone products of this industry were probably diversified eating containers serving needs similar to those of modern times. In a few hundred years the people who made them developed an advanced method of eating with stone vessels. Their cups, plates, dishes, platters, ladles, and kettles all speak of a concentrated effort to better their living condition. Many traits of their specialized stone cutting tools have survived the changes of time and are to be found in steel tools of today. These accomplishments were a definite advance from a more savage economy and mark the stone bowl people as outstanding contributors to the cultural progress of human society.

Latent desires to create artistry, always present in human beings from the beginning, were given an opportunity for self expression, and other than purely utilitarian vessel shapes often assumed lines of beauty. Whether the work of man or woman, this was an important industrial era, which probably followed a long period of more primitive living. As pottery ware at the beginning of the era was probably unknown, stone vessels represented more durable eating utensils than had previously existed. No doubt their continued use inevitably brought about a

more orderly method of eating, with corresponding changes in household customs

A study of quarry deposits at Wilbraham reveals occasional humus strata between large accumulations of steatite tailings. This condition may denote long periods of inactivity involving many years. Labor was undoubtedly sporadic, as workmen came from numerous habitation sites only as they needed new supplies of eating utensils. Add to this the fact that, because of climatic conditions, work was probably limited to six or seven months a year, and it seems probable that hundreds of years were required to remove an estimated 5000 cubic feet of steatite from this quarry. Considering the long lapse of years consumed in spreading the art of stone bowl making throughout the east, a span of 500 years for the rise and fall of this industry does not seem impossible.

While some stone products from Wilbraham seem to have been made by inexperienced artisans, many appear to be the work of trained hands. Apprenticeships were no doubt of frequent occurrence, and experienced workmen were probably on hand some of the time to guide the work along approved lines of manufacture. Nevertheless, to fashion these products much resourcefulness and individual creative ability were developed, which left their impression no doubt upon the cultural life of the age. It was a time, perhaps, when people were not free from attack, if anything is to be learned from a well-made pronged tomahawk present in crater 2 (Fig. 16, *a*). No wear appears on its blade to place it in the class of small hafted picks. On the contrary its exceptionally well formed blade seems to suggest a weapon. Thus, after probably a thousand years a forgotten war club, left behind and presumably lost, turns up to tell its story about the buried past. Evidently people came to this quarry armed against attack. They may have worked in a state of insecurity, which, however, might have been only intermittent.

While stone products, tools, and methods of manufacture are of prime importance in relating the story of the stone bowl industry, much might be missed if its socio-economic status were not also considered. Returning now to tailing removal tools, which have occurred in both steatite quarries of western Massachusetts, it has already been pointed out that they are similar to agricultural tools of this region. As the age of agriculture probably followed that of stone-bowl making, it seems safe to postulate that the tailing removal implements were the patterns from which cultivating tools were made. Perhaps those having the greatest significance are triangular tailing breakers of fairly large proportions which resemble the triangular-type agricultural hoes of a later date. Evaluation of this material suggests social relationships with important economic bearings on the stone bowl industry.

As it seems likely that woman was not only the agriculturist of a later period but also the maker of cultivating hoes,[20] it is probable she developed these tools only as the result of previous experience. That experience may have been, in fact very probably was, the training received in the stone bowl quarries. There, in earlier days she may have used tailing breakers and so may have become acquainted with their unique traits. Only such first-hand knowledge, gained from actual participation in the quarry work, could have guided woman in her ultimate fashioning of cultivating hoes. This hypothesis at once suggests that women worked side by side with men at the quarries. In fact, they may have had much to do in guiding the stone cutters as to style and proportion of vessels. Here, then, was a probable division of labor in primitive industry, perhaps the most pronounced of any up to this time.

At Wilbraham, craters or pits were formed as steatite boulders were gradually cut away, and it is likely that here again woman played an important role. After breaking up the tailings, she probably used flat stones as spades. With these she may have filled baskets with the tailings for disposal on the perimeter of the craters. With these same baskets she may also have transported the stone products to habitation sites. While evidence is lacking to show that such a division of labor was a universal practice at all quarries, further research may show that it was. Thus, it appears that woman's influence, as much as anything else, may have stimulated the growth of the industry. Likewise it is probable that, in the end, agriculture and pottery-making consumed her spare time and interest to such an extent, as to be contributing factors in closing the quarries. If this hypothesis is true, then woman played a deciding part in the rise and fall of the stone bowl industry.

Typologically, the frequent occurrence at quarries of grooved axes and of stone elbow and

[20] Fowler, 1945, p. 33.

platform pipes, suggests that the stone bowl people belong to Willoughby's Old Algonquin,[21] or to Ritchie's Laurentian and Early Coastal groups.[22] However, as evidence of pottery is non-existent at the quarries, these stone cutters probably represent the earliest migratory phase of those cultures. Even then, pottery-making may have started in some regions where steatite was non-existent, such as New York state. However, further to the east in New England, where steatite was being quarried, clay vessels were probably not made until a later day toward the close of the stone bowl epoch. While the two industries undoubtedly overlapped at various times in different localities, all evidence points to steatite as being the more ancient and as being finally supplanted by clay as the medium for pottery-making. That the stone bowl people commenced their career as stone cutters of eating vessels without the knowledge of ceramics seems an inescapable conclusion, when consideration is given to the probable excessive and concentrated labor required in the production of stone bowls. No such amount of effort would have been expended just to provide stone vessels to supplement clay pots, had the latter existed first. Evolution shows that man labors only where a distinct need is felt and rarely exerts himself to improve or supplement a condition that is already supplied.

That steatite vessels continued to be used with clay pots for many years after steatite quarrying had ceased is indicated by the association of steatite and clay potsherds on some Eastern habitation sites and in a few burials. The durability of stone vessels was probably sufficient to insure a long period of wear, and even when the vessels became cracked they could be repaired by binding with gut through holes drilled along the fractures. The fact that so many pots were repaired in this way lends weight to the belief that, in later times, manufacture of stone pots had ceased, thereby making preservation of remaining pots highly desirable.

During the last decade or so, numerous excavations throughout the east have uncovered steatite sherds in association with clay potsherds and it may be informative to review briefly the evidence.

At South Indian Field near Melbourne, Florida an excavation of a habitation site by the Peabody Museum of Yale University revealed steatite and clay potsherds in close association, distributed from top to bottom of a large midden which measured 260 feet in diameter and had a maximum depth of 6 feet.[23] From this it is evident that both kinds of ware were used at the site, probably through a very long period. However, there is no evidence to show that the stone pots from which the sherds came were being made during this time. It could well be that the stoneware of this deposit had been made previously, and was durable enough to have survived far into the period of clay pottery manufacture. Certain it is that there are no known deposits of steatite in Florida from which stone vessels could have been conveniently made to supplement clay pots.

Another association of the two wares is reported by William A. Ritchie at Orient, Long Island.[24] Here, 45 steatite vessels, all killed, were found in a pit in which cremation had apparently been practiced. There were 6 clay potsherds on the floor of the pit. In another cremation pit steatite sherds were intermixed with 25 clay potsherds. This indicates that vessels of the two wares were probably coexistent, but reveals nothing about the age of their manufacture. Some of the steatite sherds were badly disintegrated.

Ritchie reports from New York state an association of the two wares on habitation sites of the Hopewellian Phase, Vine Valley, Early Coastal, and Laurentian Aspects.[25] Allowing for some of this material to be intrusive, it would seem, nevertheless, that both kinds of ware may have been coexistent during the long period of their development. However, it should be noted that steatite sherds are absent from the late prehistoric Owasco Aspect. Evidently, the use of stone pots had ceased west of the Hudson River before historic times. Furthermore, the number of steatite sherds reported is insignificantly small as compared with clay sherds, only three or four appearing at each site. As aboriginal steatite quarries are not known to have existed in the New York area, any appearance of steatite sherds on camp sites suggests importation of finished bowls, which may have continued in use for many years after the closing of steatite quarries in other parts of the country.

In New Jersey, Dorothy Cross reports a similar association of steatite and clay potsherds, while excavating the habitation sites of Munsell, Indian Head, and Salisbury.[26] However, at each location only a few steatite sherds were found, whereas those of clay ran into the hundreds. Cross notes this apparent paucity of steatite and as a result discounts any implication that the appearance of the two wares in association might suggest.

Still again in Connecticut, excavations by the Yale Peabody Museum and the local archaeological society have turned up a few steatite sherds in association with those of clay at the Indian River,[27] Old Lyme,[28] South Woodstock,[29]

[21] Willoughby, 1935, pp. 6–80.

[22] Ritchie, 1944, pp. 235–68.

[23] See above, p. 122. *Editor.*

[24] Ritchie, 1944, p. 231.

[25] Ritchie, 1944, pp. 164, 214, 255.

[26] Cross, 1941.

[27] Rogers, 1943.

[28] Praus, 1942.

[29] Praus, 1945.

Menunketisuck,[30] and Powder Hollow[31] sites. There were four steatite sherds at one site, three at another, and a few at each of the others. Some were found in the humus, while the rest appeared beneath the humus; a number were below the clay pottery level. This gives evidence of the probable use of a few stone pots during a part of the ceramic period, but because of the relative scarcity of sherds discounts any idea of a replacement of pots from a stone industry existing at that time.

Finally, over many habitation sites in the Connecticut Valley of Massachusetts where the steatite industry is known to have flourished during its long existence, innumerable steatite sherds are found on the surface associated not only with clay potsherds but with all types of stone artifacts, both archaic and recent. However, such obviously disturbed evidence may be dismissed as of no significance except to show that stone bowls were used here to a considerable extent.

Steatite sherds occur in the deposits in insignificantly small numbers as compared with clay potsherds and cannot therefore be said to show a strong association of an active steatite industry with ceramics. However, in keeping with the usual experience of trait and industrial changes, it is possible there was an overlapping of the two industries to a greater degree in some localities than in others. It is also probable that later occupants of sites where stone vessels had previously been made found and continued to use such vessels. In some instances, this overlapping may have extended into the ceramic-agricultural period, but so far there is no evidence at steatite quarries to indicate that the actual work of bowl making continued that late.

The origin of the people who developed the idea and methods of cutting vessels out of stone, is undetermined. It is thought by some that they represent a migratory movement from the north bringing ground slate points, semilunar knives, and the knowledge of stone bowl making acquired from contact with the Dorset Eskimo. However, it cannot be proved that the Eskimo steatite industry preceded that of New England. Furthermore, the Eskimo style of pot has no similarity to that developed in New England. The Eskimo pot is oblong in shape without lugs, while that of New England is generally oval, shallow, and provided with a lug or handle at each end. As both styles are so different, it is more likely that they developed separately in response to totally different and unrelated conditions. So far, semilunar knives and ground slate points, presumably Eskimo manifestations, have not been found at steatite quarries.

Whether stone bowl making was the result of a migration or developed without outside influences cannot now be determined. Nevertheless, it is well established that over a period of time, which may have started several centuries after the beginning of the Christian era, the stone bowl people developed a great variety of eating utensils from steatite. The extensive spread of the industry north and south, wherever steatite is found, attests its enthusiastic adoption by adjacent native tribes, whatever their lineage. Evidently the greatest industrial development of the age, it supplied stone vessels for eating purposes to countless families, not only in the immediate vicinity of the quarries but by trade to widely separated parts of North America, with resultant improved eating conditions. Thus, when considered in the light of recent research, the stone bowl people emerge from obscurity as an inventive, resourceful group of aborigines, who by dint of hard work and constructive cooperation ushered in a prolonged industrial age of better living.

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[30] Russell, 1942.
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# CIUDAD REAL: A GUARANÍ-SPANISH SITE ON THE ALTO PARANA RIVER

VIRGINIA DREW WATSON

THE objectives of this paper are three-fold: (1) to make available to interested anthropologists the archaeological material which will form the basis for the discussion, (2) to point out several problems of the archaeology of the area in which the site to be discussed is located, and (3) to present a brief account of the history of the site as it is known through extant documents.

The material on which the discussion will be based consists of pottery sherds which were collected,[1] with few exceptions,[2] from the surface of the site of Ciudad Real located on the east bank of the Paraná River, at the confluence of the Piquirý River, in the present-day Brazilian state of Paraná (Fig. 32). The site is located on the elevated bank of the river some five miles north of the present town of Guayra, Paraná, Brazil, and approximately six miles above the Sete Quedas.[3] It is most accessible by fluvial transportation. The site, as far as could be ascertained, extends for a distance of at least one-half mile along the bank of the Paraná. Just how far back from the river it extends is not known; near its northern end we walked for about three hundred feet from the river bank directly inland and had not yet reached the easternmost limit.

At present much of the site is under cultivation. This has, no doubt, defaced it to some degree, but the methods of tillage used would not be as destructive of archaeological remains

[1] This collection is now housed in the Museu Nacional, Rio de Janeiro, Brazil.

[2] Two large restorable vessels, which had been disinterred recently by one of the local farmers, were also obtained.

[3] This waterfall is also known as Salto de Guayra.

as plow agriculture because soil disturbance is not as deep. Located at the site are two small farms (*ranchos*). Whether there are more or not is not known, but it seems unlikely that there would be any inland from the river, and there were no others on the river bank itself. Parts of the site are covered with secondary forest growth.

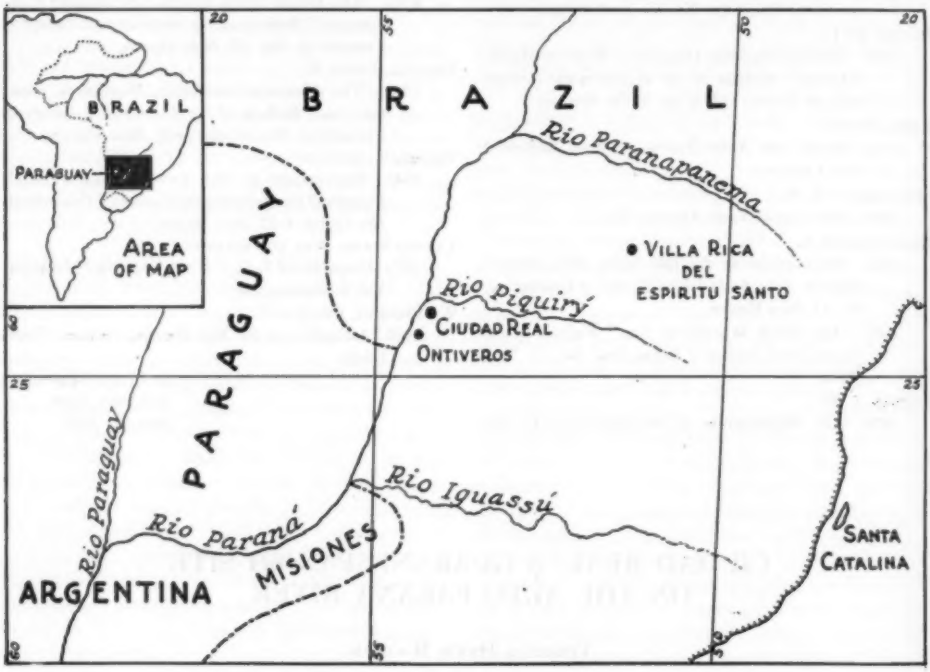


FIG. 32. Map showing location of Ciudad Real site.

In a later section of this paper some attention will be given to historical documentation of the site and of the general area in which it is located. These sources, while including fairly complete records of the activities of the early explorers and missionaries in the region, deal only incidentally with the aboriginal population. However, a perusal of the literature is rewarded with several references of value to the archaeologist and ethno-historian.

Although there is a considerable literature of historical accounts, travel accounts, and other data pertaining to the valley of the Alto Paraná River, the published archaeological data are relatively meagre, and most of the papers which do exist are not of recent date; nor did the workers, for the most part, do any intensive excavating. It is hoped that this paper will focus some attention on this neglected sphere of South American archaeology, an area which is of considerable importance and one which, it is hoped, will be more extensively explored in the near future. The inadequacy of the archaeological material at hand (surface collection only) for purposes of establishing any far-reaching conclusions, is recognized. However, it is thought that this material can be used advantageously as a core around which to organize other data and to point out some of the significant problems of the region.[4]

[4] This collection was made during the period when the writer was a Junior Roosevelt Fellow of the Institute of International Education of New York. She wishes to express her gratitude to this institution as well as to the following individuals: Dona Heloísa Alberto Torres, Director of the Museu Nacional, Rio de Janeiro; Eduardo Galvão, *naturalista* of the Museu Nacional, Rio de Janeiro; George D. Howard, Boston University, for a critical reading of the manuscript; Ralph B. Shead, Museum of the University of Oklahoma, for his excellent draftsmanship; and James

### CERAMIC DESCRIPTION

A few general statements can be made regarding the pottery. All indications point to the use of the coiling technique in ceramic manufacture. Several vessel bottoms clearly show this and the corrugated ware gives additional indication of the fact. Furthermore, the smoothing on the vessels seems to have been done by scraping rather than by use of a paddle and anvil. The predominant tempering material used is grit, although some clay occurs. There is no evidence of shell, bone, or fiber temper.[5]

On the basis of the surface collection, five pottery types have been recognized: corrugated, nail-incised, polychrome, brushed, and plain. Future investigation or excavation may warrant the definition of further types, some or all of them represented in the present collection, but their relative scarcity here does not warrant establishing them herein as types. These include several kinds of incised, basketry-impressed, and nubbed sherds.

### Predominant Types

Because the first five kinds of pottery mentioned were found in such abundance, it is felt that there is no doubt that they were made by the inhabitants of the site and therefore names will be assigned to them. For reasons which will become increasingly clear in later sections of the paper, the term "Guayra" will be applied to these types. Thus: Guayra corrugated, Guayra nail-incised, Guayra brushed, Guayra polychrome, and Guayra plain.

*Guayra corrugated* (Pl. XV, B, *a*, *b*). One of the most common types found, this ware is made of a medium paste. The temper is grit, with sand predominating but some angular particles being present also. After firing, the ware is black on the interior whereas the outer sides vary from reddish-tan to reddish-brown. The sherds range in thickness from 1.0 cm. to 1.5 cm., and the hardness varies from 3.0 to 4.5. The vessels were made of a series of coils which were smoothed and polished on the vessel interior. On the vessel exterior, however, the coils were pressed out with a succession of finger imprints. It appears most likely that the impressions were made with the thumb of the right hand and that the potter moved her hand in a counter-clockwise fashion (or the vessel in a clockwise fashion), the vector force being in a clockwise direction. The potter's fingerprints are very clear on many of the sherds. There is also indication that the potter either made the finger impressions as she built up the coils or, if she waited until after the vessel was complete before making the imprints, she worked from the bottom to the top.

Vessel forms cannot be described at this time. None of the corrugated sherds found gives any adequate indication of the vessel shape and the one restorable vessel is still in sherd form. It is possible, however, that vessel forms are similar to those described for corrugated ware by Lothrop,[6] Ambrosetti,[7] and others. The size and thickness of the sherds suggest sizeable vessels. Two rim forms commonly found in corrugated ware vessels are shown in Figure 33, *a*, *b*. One rim sherd exhibits a series of pieces of clay appliqued on the rim—or perhaps it is one long roll of clay which has been pressed with successive thumb or finger impressions.

Nordenskiold has concluded that this type of pottery ornamentation originated among the Guarani[8] and was disseminated by them.[9] He discusses its distribution. Of particular interest to this paper is the fact that apparently similar,

B. Watson, for his assistance and criticism in the collection and analysis of the material of this article. Especial thanks are due Sr. Eduardo de Oliveira César of Buenos Aires, who told us of the Ciudad Real site and generously made arrangements for us to visit it.

[5] There are a very few sherds which, on more minute examination, might prove to be fiber tempered (possibly bark?).

[6] Lothrop, 1932.

[7] Ambrosetti, 1895.

[8] The term Guaraní is one of the most overburdened in South American anthropology. It has linguistic, archaeologic, ethnologic, and ethnographic connotations. In combination with other words (e.g., Tupí) these become even greater in number. It is suggested herein that a committee of competent and interested investigators be formally or self-appointed to define the term and to suggest substitute terms for those meanings which are not embodied in the definition of "Guaraní." In this paper no attempt has been made at definition of the term and it has been used in several senses. The author knows that the persons interested in this particular field of archaeology will know what she means—each of us has a fairly clear idea of what the term means in any given instance—but unfortunately there is no precise definition and that is what is needed. It is needed soon—before work has progressed to such a point that everyone does not recognize what the term means in a given instance, thus leading to major misunderstandings in supposedly careful and/or scientific work.

[9] Nordenskiold, 1919, pp. 217–18.

if not identical, pottery has been found in Misiones, Argentina,[10] and the Paraná Delta.[11]

*Guayra nail-incised* (Pl. XV, B, *c*, *d*). Of great frequency in the collection, but less so than Guayra corrugated, is Guayra nail-incised. This ware is of fine to medium paste which, upon firing, turns black in the middle and remains (reddish-) tan to brown on the exterior. Firing of these sherds seems to be somewhat less well done than that on the corrugated sherds, and cloudy gray spots occur on several sherds. Sherds of this type range from 0.6 cm. to 1.1 cm., and the hardness varies from 3.0 to 4.0. One nail-incised sherd is worthy of mention as it seems to be the ultimate in good firing. The core is very dark gray (almost black) with a tan stratum approximately 1 mm. in thickness on the outside wall and a still thinner stratum on the inside wall. In this sherd, as well as some others, the very thin, light-colored strata give the impression, on first glance, of being a slip. However, it is the opinion of this writer that such is not the case. The strata are considerably thicker than a slip and they do not flake readily. Outes[12] evidently refers to the frequent occurrence of this sort of thing at Martin Garcia Island in the Paraná Delta when he says that one can note three definite zones in the sherds: reddish or red-tan on the external side, black in the middle, and reddish or red-tan on the internal side.

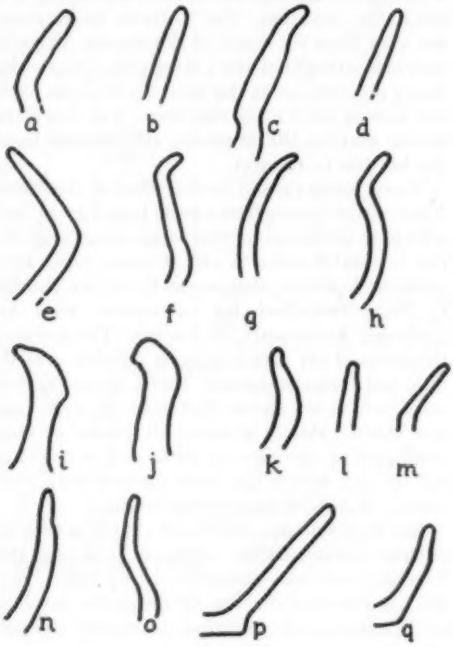


FIG. 33. Cross sections of pot rims from Ciudad Real site.

The nail-incised ware is made by the coiling process after which the coils are smoothed on both the interior and exterior of the vessel. The interior of the vessel is polished. On the exterior surface decoration consists of a series of finger- or thumb-nail incisions. These are usually applied in rows and often the rows of these incisions run parallel, or approximately so, to each other. The distance between the rows varies from sherd to sherd, as does the distance between each individual nail incision. In a few instances the rows of marks tend to overlap.

As with Guayra corrugated, vessel forms cannot be described, but the rim forms commonly associated with this type are pictured in Figure 33, *c*, *d*.

Examples of this type of decoration have been found by Ambrosetti,[13] Outes,[14] and Lothrop[15] in the Paraná Valley. It is also reported from contemporary Chiriguano.[16] These examples presumably are representative of similar cultures. Metraux notes it among certain Chaco tribes and implies that they received it from Guaraní groups when he indicates that "the Mataco, immediate neighbors of the Chiriguano (Guaraní-speaking), more often decorate their pottery with fingernail impressions . . . than do the other tribes of the area."[17] Fingernail incised decoration has also been noted in Patagonia in the San Blas Peninsula, and Bruzzone mentions it among Querandí sherds from Buenos Aires province, Argentina.[18] From the photographs and sketches I have seen of these latter two, one important difference from the forementioned examples is manifest: the orientation of the nail incisions on the vessel. On the Paraná Valley and Chiriguano sherds and vessels the marks, on those sherds on which orientation on the

[10] Ambrosetti, *op. cit.*

[11] Lothrop, *op. cit.*, pp. 132 ff.; Outes, 1917, p. 268.

[12] Outes, *op. cit.*

[13] Ambrosetti, *op. cit.*

[14] Outes, *op. cit.*

[15] Lothrop, *op. cit.*, pp. 134–5.

[16] *Ibid.*

[17] Metraux, 1946, p. 290.

[18] Bruzzone, 1931.

vessel is discernible (i.e., rim sherds), tend to be made with the axis running perpendicular to the rim of the vessel, or vertical, while in San Blas and Punta Lara the incisions run parallel to the rim, or horizontal. Whereas this distinction is suggestive at the present time, further excavation and further examination of nail-marked sherds may prove it to be fortuitous.

The sherd pictured by Willey[19] (after Bruzzone) attests to the tendency to overlapping of the incisions on at least the Punta Lara sherds and would permit the application of the term "imbricated" to the ware. On the nail-incised sherds in the present collection, the marks tend to be separated, one from another, vertically and horizontally, and with few exceptions cannot be described as imbricated.

On the majority of sherds of this type from Ciudad Real, the nail marks all face in one direction, although on a few sherds a number of lines of marks facing one way are placed over several lines of marks facing in the opposite direction (Pl. XV, B, *c*).

*Guayra polychrome* (Pl. XV, B, *g*, *h*). The polychrome sherds found include one restorable vessel. The paste is usually medium to coarse. For the most part it is grit tempered with sand and angular particles. There is evidence that clay (probably ground up sherds) was also used as a temper in this ware. The thickness of the sherds varies from 0.9 cm. to 1.4 cm. and the hardness range is from 3.5 to 5.0. Firing of this ware has also produced a black or dark gray core and the tan to brown exterior.

Painting consists of red, brown, and white on the same sherd. Typical is a white band painted parallel to, and extending from, the rim, on which are painted brown line designs; under this is a band of red, below which is a band of white on which are brown lines. Plate XV, B, *g*, *h* shows two rim sherds. One sherd, which may be of this ware, but more probably is not (possibly a trade sherd), has brown lines on a red background. The brown in all cases may once have been black.

The interiors of some of the polychrome sherds have been polished while some of the interiors are very rough, suggesting either that the potter did not smooth them or, in view of the fact that it is likely they were used for burial jars, that the action of the bones and soil on the clay resulted in the "corroding" of the vessel interior.

[19] Willey, 1946, Plate 17.

The paint, particularly the brown, tends to wash off quite readily and in several instances was almost completely obliterated when the sherd was found. The body sherds from the restorable polychrome vessel appear to have been painted with a white substance although no design was painted on that part of the vessel.

Rim forms associated with polychrome ware tend to be somewhat unique and are shown in Figure 33, *i–j*. Vessel form cannot be described at this time, although it seems likely that the vessels tended to be large in size.

This type of pottery has been reported by Lothrop,[20] Outes,[21] and Ambrosetti[22] from archaeological sites in the Paraná Delta and Misiones, Argentina. It is also reported for the Chiriguano and Conebo. Lothrop[23] has presented a more detailed discussion of its distribution.

*Guayra plain* (Pl. XV, B, *j*, *k*). A large number of the sherds found belong in this type. In general the paste of the type is medium, and grit, both sand and angular fragments, is the temper. Firing produces black interiors and tan to brown walls, as it does on most of the other types. Hardness ranges from 3.0 to 4.0, with the thickness of the sherds varying from 0.7 cm. to 1.2 cm.

The vessels of this type were made by the coiling process, subsequent to which the interior and exterior of the vessels were smoothed, and the interior often polished. In many cases there is no surface treatment other than smoothing, but on some of the sherds a red slip has been applied. The durability of the slip varies from sherd to sherd. On several of the rim sherds one incised line runs parallel to the rim, its distance from the rim varying from one case to another.

Although vessel forms cannot be described, the variety of rim forms associated with this ware suggests a wider variety of forms than is the case with the other pottery types (Fig. 33, *k–o*).

Guayra plain is probably similar to what Lothrop has called Red Ware at the Arroyo Malo site in the Paraná Delta.[24] It is also reported by Outes[25] from Martin Garcia Island.

[20] Lothrop, *op. cit.*, pp. 139 ff.
[21] Outes, *op. cit.*
[22] Ambrosetti, *op. cit.*
[23] Lothrop, *op. cit.*
[24] *Ibid.*, pp. 35 ff.
[25] Outes, *op. cit.*

*Guayra brushed* (Pl. XV, B, *e, f, i*). This ware is of medium paste which is tempered with grit (sand predominating) and usually becomes dark grey to black on firing. The interiors vary from tan to dark grey; some are polished. Sherd thickness ranges from 0.9 cm. to 1.2 cm. and the hardness from 3.0 to 5.0. At the outset, let it be said that there is considerable variation in the sherds which have been grouped together here, particularly as to details of decoration, but also in thickness, color, and form(?). It is possible that excavation of the site will indicate the necessity of breaking down the classification. In general, though, the decoration consists of a series of striations which may be diagonal or parallel to the vessel rim; they may be well or carelessly done, the former predominating near the rim and the latter being more common toward the bottom of the vessel. These markings may be the only decoration, or an incised line may run parallel to the vessel rim and roughly perpendicular to the markings. Or a series of depressions, probably made with a blunt instrument, may encircle the vessel parallel to the rim (distance from rim unknown). Rim sherd cross sections are shown in Figure 33, *e, h*.

The technique or techniques of applying this decoration are not known. Some sherds give the appearance of being grass- or brush-wiped. Others are so evenly striated as to suggest a comb (possibly of bamboo). A further possibility is suggested by Nordenskiold. In speaking of the coiled pottery of the Chiriguano and Chané, he says:

> Stones, mussel-shells and empty corn cobs are used for smoothing the vessels. The last mentioned leaves characteristic marks. It looks as if some comb-shaped instrument had been applied. These marks diminish the smoothness of the vessel so that it slips out of the hand less easily. Corn cobs are therefore more especially used in the making of cooking pots and large utensils.[26]

The distribution of this ware poses an interesting problem. Lothrop does not mention its occurrence at the sites he excavated in the Paraná Delta (and one of them he has identified as having been occupied by Guaraní Indians). Nor does Outes mention any of it from the sites he has excavated in the same general region and supposedly representative of the same culture. Farther to the north, Ambrosetti in his excavations in Misiones (Paraná Valley) does not mention this type although these sites are likewise given a Guaraní provenience. In the surface collection from Ciudad Real, which, as we will show below, has Guaraní provenience, some 150 to 200 miles north of the sites dug by Ambrosetti and on the same river, this ware is fairly abundant.

As to its further distribution Nordenskiold says:

> I have seen vessels marked in this way (corn cobs) at Ojo de Agua in the most northern part of Argentina. On the other hand they are lacking on the pottery which I found in my excavations at Caipipendi and in the whole of Northeastern Bolivia.[27]

Admitting that the complete distribution of this type of surface decoration is not known, it already presents some interesting problems. If corn cobs were used in its manufacture, its presence among a group would depend on the presence of maize agriculture (barring the possibility of obtaining corn cobs through trade). Lack of this type of decoration, of course, could not be used as an argument for lack of maize agriculture.

Very interesting is the occurrence of these sherds in abundance at Ciudad Real, while close to the south, in Misiones, and somewhat farther south, in the Paraná Delta, sites supposedly inhabited by culturally very similar groups have not had this type of pottery.[28] Supposedly the peoples with Guaraní culture moving south to the Delta carried agriculture with them and some maize was grown there. Any attempts at solution of this problem at the present time would be mere speculation and have no place in this paper.

We cannot assume, of course, that corn cobs were used in the decorative technique at Ciudad

[26] Nordenskiold, 1920, p. 137. Whether or not this is Nordenskiold's or the Indians' reasoning, it seems somewhat more plausible than the frequently given one that the roughness provides for greater heating surface.

[27] Nordenskiold, *op. cit.*

[28] As Howard has pointed out (personal correspondence), it is possible that this type "did not attract the attention of other investigators such as Ambrosetti." This may very well be true. However, in the case of Lothrop and Outes, both of whom handled a considerable amount of material, it seems unlikely that they would not have noted brushed ware, particularly if it had occurred in quantities which at all approximated that at Ciudad Real. Dr. Howard has also called to my attention an article by Max Schmidt (1932) in which he reports the following wares from Paraguay—particularly the vicinity of Ipane: corrugated, nail-incised, polychrome, brushed, and plain.

Real. It is merely a possibility. The variation in sherds also suggests the possible use of such things as brush, grass, and bamboo comb.[29]

### Other Sherds

The types of sherds which are not represented in sufficient quantity to warrant designating them as well-defined, recurrent types are: nubbed, basketry-impressed, and incised line. It is hoped that excavation will shed further light on these sherds and that eventually we will know if they form an integral part of the ceramic tradition at the site or if they are extraneous (probably trade) sherds. For the time being it seems most likely that they are trade sherds.

*Nubbed* (Pl. XV, A, *a*). This is represented by only two sherds in the entire surface collection. The paste is medium to coarse and the temper is grit although angular particles are more abundant than in the forementioned types. After firing the interior is a dark gray to tan and the exterior reddish brown. Thickness is 0.9 cm. and hardness is 4.5.

Two types of decoration are present. The upper portion of the sherd is brushed. The lower and somewhat larger portion is covered with nubs or nodules of clay which seem to have been applied to the surface of the vessel after the coils had been smoothed but before the vessel was fired. (There is a suggestion that the surface of the exterior may have been brushed before applying the nodes. Possibly the vessel was "smoothed" with corn cobs in the manner of which Nordenskiold speaks. It is difficult to tell, however.) These nubs seem to have been made more secure to the vessel by applying pressure on two or three sides of the base of each nub with some blunt instrument. One nub is considerably larger than the others and perhaps should be designated a lug. The interior of the vessel had been smoothed but not polished. The interior surface now has a cracked appearance.

As to the distribution of this particular type of sherd, little can be said. Lothrop[30] pictures a small fragment of pottery which looks similar to the two pieces found at Ciudad Real. He mentions that the piece is a form of Red Ware "covered with spikes."[31] This find (made at Arroyo Malo) together with certain other "unusual" forms leads him to conclude that the site is "apparently the southern limit of widely distributed pottery types."

Metraux,[32] in an ethnographic account of the Mataco and Chorotí Indians of the Chaco, says "a few cooking pots are ornamented with rows of small clay pellets put on the surface when the clay is wet."

There is no indication that brush marking was combined with nubbing in either of these two instances as was true at Ciudad Real.

*Basketry-impressed* (XV, A, *b*). Only one example of basketry-impressed ware was found. The paste is medium and is grit tempered, with sand predominating over angular particles. Unlike most of the other sherds it is of uniform color throughout—that is, a reddish tan. The interior surface of the sherd has been smoothed but not polished. (There is a suggestion of a slip.) The decoration consists of basketry impressions probably made either by applying a piece of basketry to the surface or by applying clay on the inner surface of a basket to construct the vessel. From the sherd, however, it is impossible to determine the technique of manufacture. Although the specimen is quite worn, the weave would seem to be that of a simple wicker basket. The sherd is 1.0 cm. in thickness and its hardness is 3.0.

Aparicio[33] has found a number of net-impressed sherds at Mar Chiquita in the Argentine province of Cordoba. Serrano[34] discusses at some length the basketry-impressed ware which is frequently found in Cordoba, where it seems to be a fairly common practice to mold clay vessels on baskets. Of closer provenience to Ciudad Real is the basketry-impressed ware which Schmidt found in Matto Grosso.[35]

*Incised line.* The incised-line sherds of the collection have been tentatively divided into six categories for purposes of facilitating description. Because of the relative dearth of these

[29] An experiment was made to see what types of striated decoration could be made in plasticene with various types of corn cobs. Cobs from popcorn and an inferior grade of field corn made a pattern which most closely approximated some of the Guayra brushed sherds. At this time, however, it seems unlikely that all of the sherds which have been grouped together as Guayra brushed were decorated by use of corn cobs. At the same time, of course, there is no proof that any of them were.

[30] Lothrop, *op. cit.*, Plate IX, *b*.

[31] *Ibid.*, p. 137

[32] Metraux, *op. cit.*, p. 290.

[33] Aparicio, 1942, p. 45.

[34] Serrano, 1945, pp. 195 ff.

[35] Schmidt, 1940.

kinds of sherds in the collection, it is not felt wise to divide them into sub-types, yet they do differ enough from one another so that this should be brought out in any initial description. Perhaps when the site is excavated, these sherds will be found to be representative of X number of types, or to be merely extraneous or trade sherds.

*a*) Plate XV, A, *c* shows a dark grey rim sherd which is of medium paste with grit temper including both sand and angular particles. The interior of the vessel had been smoothed but not polished before firing. The sherd is 1.0 cm. in thickness, and the hardness is 3.0. At first glance the decoration seems to consist of medium rectilinear and curvilinear incisions. Irregularities on the walls of the incisions, however, becoming more clear on a plasticene mold, suggest that cord might have been used in making the incisions, with subsequent scraping of the incision bottom with some instrument. This sort of cord marking, if that it be, is suggestive of some Mbaya-Caduveo pottery.[36]

*b*) Plate XV, A, *e* shows a reddish tan rim sherd of fine paste with grit temper, predominantly sand. The sherd is 0.8 cm. in diameter, and the hardness is 3.0. The paste is uniformly reddish tan throughout. The interior of the vessel was smoothed but not polished. Decoration on the exterior consists of fine incised lines.

*c*) Plate XV, A, *j* shows a small sherd, reddish tan in color of medium paste with sand and angular particle temper. The interior paste is black with reddish tan on the surfaces. The sherd is 0.8 cm. in diameter and the hardness is 3.5. The interior of the vessel was smoothed but not polished. Decoration on the exterior consists of zigzag incised lines.

*d*) Plate XV, A, *f* shows a dark grey sherd with medium paste, which is grit tempered with sand and angular particles. Color is uniform throughout. The sherd is 0.8 cm. in thickness and the hardness 4.0. The interior of the vessel was smoothed but not polished. Decoration on the exterior of the vessel consists of fine incised lines.

*e*) Plate XV, A, *i* shows a small sherd of medium paste with grit temper. The color is black on the inside and reddish tan on the exterior surfaces. The sherd is 0.8 cm. thick and measures 3.0 in hardness. The interior of the vessel was smoothed but not polished and now gives a cracked appearance. Decoration on the exterior of the vessel was made by fine incised lines which are partially obliterated.

*f*) Plate XV, A, *g*, *h* shows two sherds of medium to coarse paste with grit temper, including some fairly large angular particles and sand. The color is tan to reddish tan throughout. The thickness of the first specimen is 0.6 cm. and of the second, 1.0. The hardness of the first is 3.5 and of the second, 4.0. Both pieces bear incised decoration on the vessel interior, suggesting some sort of flat vessel or plate. The vessel exteriors were smoothed but not polished. The incised lines are broad and are both curvilinear and rectilinear. No mention has been found in the literature surveyed of this type of ware. Painting on vessel interiors, however, is reported particularly by Boggiani[37] for the Mbaya and Serrano[38] from Santiago del Estero.

No attempt has been made to determine the provenience of each sherd decorated with incised lines. It should be pointed out, however, that incised line decoration is not uncommon among certain Pampan tribes as well as some Chaco tribes. Certain of the Ciudad Real incised-line sherds show striking similarities to some of those which Lothrop, for example, indicates as having been made by certain Pampan groups.[39]

"*Modern Paraguayan*" (Pl. XV, A, *d*). Finally, mention should be made of several sherds of "modern Paraguayan" ceramic ware which were found at Ciudad Real. These have black cores and red surfaces. Made on a wheel, these sherds differ considerably in form from the majority of the sherds found. It is possible that the Indians at the site did make this sort of pottery after receiving the European-introduced wheel, but at present it is impossible to make exact identification of these sherds. Figure 33, *p*, *q* illustrates rim forms associated with this ware.

### HISTORICAL MATERIAL

As has been mentioned, the site from which the pottery sherds just discussed were taken, is located on the east bank of the Paraná River at its confluence with the Piquirý River in what is now the Brazilian state of Paraná (Fig. 32). The first name given to the region in which the site is located was "Guayra"; it was first traversed by Europeans under the leadership of Alejo Garcia in 1524. In that year one of the ships in the expedition of Juan Diaz de Solis was shipwrecked near the island of Santa Catalina off the Brazilian coast. Garcia, a member of the group, hearing tales of a land of riches somewhere to the west (probably Inca territory), set out in this direction under the guidance of several Indians. They crossed from the Atlantic Ocean to the Paraná River north of Iguassú, and continued on to the Mondaý River. After that, this great area of land was incorporated in the dominions of the King of Spain and subjected to the control of the au-

[36] Boggiani, 1895; Metraux, 1946, p. 291.

[37] Boggiani, *op. cit.*

[38] Serrano, 1938.

[39] Lothrop, *op. cit.*

thorities of the Spanish province of the Rio de la Plata, with headquarters at Asuncion (present-day Paraguay). Part of this rich zone was called Provincia del Guayra. Guzman attributes the name to a chief of a Guaraní tribe who at that time lived near the Guayra falls (Sete Quedas).

This province was located between 22′ 30″ and 25′ 30″ latitude and 49′ 30″ and 54′ 30″ longitude west of Greenwich. The Paranapanema River formed the northern limit, the Iguassú River the southern, the Guarayrú or Caiyú hills the eastern, and on the west the Paraná River formed the boundary.

In this resumé interest will be focused not on the history of the entire region, but only that part which bears directly on our material, in an attempt to learn as much as possible of the site and its environs in historic times.[40]

*Settlements.* The first settlement in Guayra, called Ontiveros, was made in 1554. Guzman says the following:

> .... (Irala) dio facultad al Capitan Garcia Rodriguez de Vergara, para que con sesenta soldados fuese á hacer esta población; y, tomando los pertrechos necessarios, salió de la Asuncion el año 1554, y con buen suceso llegó al Paraná, y pasó de la otra parte donde fué bien recebido de los indios de la comarca, y considerando el puesto mas acomodado para el asiento de su fundacion, tuvo por conveniente el hacerla una legua, poco mas ó menos, mas arriba de aquel gran Salto en el pueblo de los indios sujetos al cacique Canendiyú que era muy amigo de los españoles.[41]

This first Spanish settlement in Guayra, Ontiveros, was located a short distance south of the site in which we are primarily interested. Within a short period of time after its founding, however, the Indians at Ontiveros rebelled and the Spaniards were confronted with failure in their first attempt to found a settlement in the province. There was also open conflict between two factions of Spaniards.

A second attempt at settlement was made two years later, in 1556, and it is this settlement which will be of greatest importance in the present discussion. Guzman says:

> .... partio el capitan Melgarejo con cien soldados, y llegado felizmente al Paraná, paso a la otra parte a los pueblos del Guaira, y habiendo especulado la disposicion del terreno, hizo su fundacion tres leguas mas arriba de la villa de Ontiveros con titulo de Ciudad Real, donde agrego toda la jente que antes habia quedado en la cercania de aquel peligroso salto, por haber contemplado ser mejor el sitio que se hacia esta fundacion, que el de la villa de Ontiveros. Empezose esta a los principios del ano de 1557 en sitio rodeado de grandes bosques y arboledas sobre el proprio rio Parana en la boca del rio Pequiri.[42]

Ciudad Real, then, was the second Spanish settlement to be made in the province of Guayra and the first one to continue for any length of time. It was founded at the confluence of the Piquirý and Paraná Rivers, at the location of the site from which the sherds discussed herein were collected.

According to Guzman, the selection of the site for a settlement was not too happy for:

> A mas de los vapores que salen de los montes, esta bajo el Tropico de Capricornio, por cuya causa es muy nocivo el calor del sol y causa en el otono fiebres agudas y pesadas modorras.[43]

Hernandez mentions the climate of Ciudad Real in the following manner:

> Una penosa dolencia de fiebres, muy comunes en aquel territorio bajo y casi pantanoso de Ciudad Real. . . .[44]

In 1570, Melgarejo, hearing of a land to the east of Ciudad Real in which there were gold deposits, left the village to found a third settlement (chronologically), which, because of its supposed location in a rich mineral area, he named Villa Rica del Espiritu Santo. This settlement was approximately sixty leagues east of Ciudad Real. (Doubt has been expressed by certain authors as to its exact location, but this is not of great importance to the present discussion.)

From the time of its founding to the period in which the Spaniards abandoned Guayra, Villa Rica figures more frequently in the historical sources than does Ciudad Real. Perhaps several factors account for this, including the superior location of the former with reference to

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[40] The abundance of historical literature on Ciudad Real, Guayra, and the Alto Paraná Valley in general, includes sources of a primary, secondary, tertiary, and even quaternary nature. Naturally, they vary as to quality and fidelity. No attempt has been made in this paper to evaluate formally the sources, but in general it can be said that the ones cited are among the more acceptable. In any complete ethno-historical study of this region, or in any study in which these sources are used, some evaluative notes should be made.

[41] Guzman, 1882 (1612), Book II, Chapter XIV, p. 142.

[42] *Ibid.*, Book III, Chapter III, p. 158.

[43] *Ibid.*, p. 84.

[44] Hernandez, 1913, p. 10.

spatial location as well as to environment. Cardozo says: "La Villa Rica estaba en el corazon mismo de la Provincia, en un lugar alto, poblado y fertil."[45]

Reference has already been made to the unfortunate choice for the settlement of Ciudad Real. And although the river bank is fifty to seventy-five feet above the river at the site, it is easy to understand that the climate would be very damp, mosquitoes and other insect pests would be in abundance, and all in all the location would not be ideal.

*Population.* It seems evident that the area in general in the mid-sixteenth century had a considerable indigenous population. Cardozo, alluding to the province itself, says:

> Como consecuencia de las relaciones estabelecidas entre los conquistadores asuncenos ye los pobladores indigenas de la zona del Guaira—*pobladisimo*—fue la presencia en la capital . . . .[46]

The Indian population at Ciudad Real at the time of the Spaniards' arrival is mentioned in the literature. The estimate is undoubtedly very high, as the early Spanish explorers and later missionaries in the Paraná Valley were prone to exceed actual counts by considerable figures. Guzman has the following to say:

> Empadronaronse en aquella provincia en todos los rios comarcanos a esta ciudad cuarenta mil fuegos, que se entiende cada fuego por un indio con su mujer e hijos. . . .[47],

Lozano refers to the Indian population of Ciudad Real as follows:

> El pais (Guayra) estaba sumamente poblado de indios, tanto que en 1557 hizo Irala un padron de los que vivian en las inmediaciones de Ciudad Real, y resultaron cuarenta y cinco mil familias, que bien suponen doscienta mil personas.[48]

It will be noted from the above that the count includes a certain area around the actual settlement. Just how large a region it embraced we do not know. Cardozo says of Villa Rica: "Se calcula que la población indigena era de trescientos mil."[49]

Few figures as to the Spanish population of the province are available. Montoya indicates that as late as 1601, when the Jesuits entered the area in relatively large numbers, there were only fifty Spaniards at Ciudad Real and one hundred at Villa Rica. No doubt the population of the two towns had shifted from the days of their founding to that period. According to Guzman, one hundred Spaniards were in the founding company of Ciudad Real and Melgarejo tells us that forty men accompanied him on his founding trip to Villa Rica.

There follows a discussion of a few events in the history of Ciudad Real. Unfortunately, the native or aboriginal population is rarely mentioned in the historical sources. It is interesting to allude to certain events which, although they deal particularly with the Spaniards, must have had some effect on the lives of the Indian population, and may, when the site has been excavated, tie in nicely with certain archaeological findings.

*Revolts.* In reading the accounts of the period of Spanish occupation of Ciudad Real, one is impressed by the occurrence of several revolts. (This includes those between factions of Spaniards as well as between Indians and Spaniards.) In offering a reason for this, Cardozo may be correct when he says:

> Las ciudades del Guaira se caracterizaron por su altivez que se tradujo, repetidas veces desde su genesis, en rebeldias y anarquias, tal vez porque sus pobladores, fueron los inquietos de la Asuncion enviados alla por el gobernador ya precisamente por ello, para librarse de su presencia, o por la enorme distancia que quedaban de la ciudad madre que tampoco podia vanagloriarse de muy disciplinada, o porque, en realidad, los lugartenientes que ejercian la autoridad no eran de los mejores. Asi, aquellos nucleos humanos viveron, en su origen, como la misma Asuncion, duenos de sus proprios destinos.[50]

The first revolt of the province, as has been mentioned, took place at the first established settlement, Ontiveros, a short distance south of Ciudad Real. At Ciudad Real there occurred, in 1561, a revolt of Indians against Ruy Diaz de Melgarejo. Neither Guzman nor Azara, two early sources, gives a reason for this revolt. We do learn, however, that aid was sent for and Alonso Riquelmo de Guzman, with sixty Spaniards, went to the aid of their beseiged compatriots:

> . . . consiguio romper el cerco y salvar a la ciudad sitiada y a sus defensores. Riquelme y sus expedicionarios recorrieron la Provincia en tren de pacificacion. Despues de

[45] Cardozo, 1938, p. 43.
[46] Cardozo, *op. cit.* Italics are mine.
[47] Guzman, *op. cit.*, p. 159.
[48] Lozano, 1874, Book III, Chapter II.
[49] Cardozo, *op. cit.*
[50] *Ibid.*

haber matado a muchos infelices indios volvieron a la Asuncion en 1562.[51]

In 1569 a third revolt, this time between factions of Spaniards, took place. A certain group of men, having found rock crystals which they believed to be precious stones, asked the governor for permission to bring these to the attention of the King of Spain.[52] Permission was refused; the men revolted and abandoned the city. The forementioned revolts, it might be pointed out, all transpired before the founding of Villa Rica del Espiritu Santo, the third Spanish settlement in the province of Guayra.

*Disease.* As followed in the wake of European contact with native populations in many parts of the world, disease spread through South America. The "pest" of 1589 is the earliest widespread epidemic which traversed Guayra of which we have mention. Hernandez says:

> . . . la terrible peste que, empezando el ano antes en Cartagena de Indias, corrio por toda la America meridional propogandose solo entre los naturales del pais, y respetando a los nacidos en Europa; . . .[53]

He also refers to the pest at Ciudad Real in recording that two priests, after aiding the stricken in Asuncion, returned to Villa Rica and Ciudad Real,

> . . . adonde se habia extendido el mal; y no tuvieron poco que hacer en auxiliar tambien alli a los enfermos de raza blanca, y luego *a los indios, en quienes todavia se cebaba mas el contagio.*[54]

*Economic life.* A few insights are given by Hernandez into the life of Ciudad Real—at least insofar as the economic situation is concerned. These few facts suggest to what extent the economy of the aborigines must have been affected by the Spaniards. Wine, sugar cane, cotton, and textiles were produced; wax was collected from the forests. The Indians cultivated *mandioca*, *mani*, *porolo*, and *zapallo*. According to Montoya, the banana was also known and used as food. Of great importance economically, from the point of view of the Spaniards, was the *herva mate*, which could be collected from the forests and sent out of the province. Evidently Villa Rica was much more strategically located, from the point of view of quantity of mate trees, than Ciudad Real, a fact which was, no doubt, one of the reasons for her greater importance during the Spanish domination.

Presumably, the prime motive of the Spanish who colonized Guayra was to exploit the natural resources of the area to the explorers' best advantage. The native labor supply was also exploited and the *encomienda* system of *mitayo* and *yanaconas*, through which the labor and services of the Indians were exploited by the Spaniards, is described and discussed in the literature. In regard to Ciudad Real, Guzman says that the Indians were *encomendados* to seventy Spaniards.[55]

*Missionaries.* The first direct influence of missionaries on Ciudad Real occurred in 1588 when Manuel Ortega and Tomas Filds arrived at the town. They worked there approximately one month in the effort of baptising both Spaniards and Indians. From there they both went to Villa Rica where three months were spent in baptising the Spanish and Indian populations (one more attestation, no doubt, to the considerably larger population of Villa Rica).

The history of the work of the Jesuits in the entire province of Guayra is a lengthy story. Their founding of reductions and their catechising activities were extensive. The effect which their presence had on the culture of the Indians must have been great indeed and can be studied in greater detail with considerable profit. Consideration of this historical period is outside of the confines of the present paper, not only because of the quantity of detail but also because Ciudad Real was never a reduction or, so far as we know, completely dominated by missionaries.

During the seventeenth, eighteenth, and nineteenth centuries few concrete data about Ciudad Real are available. We have no clue as to the exact date of the desertion of Ciudad Real by the Spaniards. However, they left the province in mid-seventeenth century, forced out by the Brazilians pushing in from the east.

## SUMMARY AND CONCLUSIONS

Ethnological, archaeological, and historical data are available for the cultural identification of the material just discussed. From historical

[51] *Ibid.*

[52] One of the men now living on the site has found several quartz crystals in the vicinity. He, too, wondered if they might not be precious stones.

[53] Hernandez, *op. cit.*, p. 6.

[54] *Ibid.*; italics mine.

[55] Guzman, *op. cit.*, p. 159.

sources it is known that the site in question was inhabited by Guaraní Indians in prehistoric (at least late prehistoric) and historic times, and also by Spanish explorers during a certain period of historically recorded time.[56] As far as we know, this is the first historically recorded Guaraní site at which archaeological reconnaissance has been made. Undoubtedly, there are more such sites in the same region, and it is to be hoped that more complete survey and excavation can be carried on in the near future.

Because of the very close similarities of the Ciudad Real material to other Paraná Valley materials which have been identified as Guaraní, archaeological information is of great value in the cultural identification of the site. As early as 1895, Ambrosetti identified the archaeological material found at Foz de Iguassú, Yaguarazapá, and several other sites on either side of the Paraná River as being Guaraní. In fact, he went so far as to identify it as Cainguá.[57] More recently Outes and Lothrop have identified similar materials found at sites in the Paraná Delta as Guaraní.[58]

Ethnologically, modern Chiriguano pottery, in contrast to that of certain other Guaraní groups, notably the Cayuá,[59] is strikingly similar to that found at Ciudad Real.

Whether the site was inhabited by only one group of people at any one point in time or at various periods in the history of the site, we cannot say. Excavation will certainly throw light on this problem. From what is known of the Guaraní people and the region, it is reasonable to expect that the site was occupied solely by Guaraní, with the possible exception that some other group may have lived there at some time prior to Guaraní occupation. If stratigraphic studies do indicate the precedence of some group over the Guaraní at Ciudad Real, regardless of the relative length of antecedence, light will be shed on the still existent problems of Guaraní provenience and of earlier inhabitants in an area later heavily populated (presumably) by Guaraní. Excavation of Ciudad Real should also give some indication of population density.

That the Guaraní at Ciudad Real were engaged in, or benefited from, rather widespread trade relations is indicated by the surface material. The whole problem of the extent (temporal and spatial) and intensity of these relationships should become more clear with future excavation. At the present time there are indications of intercourse with certain Pampan, Chaco, and Mato Grosso people of cultures differing from that of the Guaraní. These embrace a considerable area, and conceivably some indications of contact with Peruvian cultures may be expected with future research. Undoubtedly, there was contact between the people of Ciudad Real and other Guaraní groups, particularly those to the east in Brazil.[60] These contacts will be somewhat more difficult to recognize due to cultural identity and similarity. In this connection, though, it must be remembered that the Paraná River has tended to have a great effect on the people living in its valley and it would not be surprising to find that the Guaraní along its banks were in closer contact with groups down the river and on its western affluents than they were with the various tribes in Brazil (excepting those on tributaries of the Paraná, which in

[56] Archaeological evidence of Spanish occupation consists of the roof tiles which were found during the surface survey, possibly the pottery already mentioned as "Modern Paraguayan" (in which case the term "Modern Paraguayan" should be abandoned), and two very large trees joined together about twelve feet above the ground (at the present time) to form a single trunk. The resulting arch is impressive. The tree is of a kind different from the others of the region and possibly is of European provenience. It is called a "figueira" by the local Brazilians, a term which, however, is applied by them to a number of trees, so that it is of little use for identification purposes.

[57] Watson, J. B., MS.

[58] Lothrop, *op. cit.*; Outes, *op. cit.*

[59] Contemporary Cayuá pottery is a relatively crude undecorated ware. The ceramic art in at least one Cayuá village (Taquapirí in southern Mato Grosso, Brazil) is on the verge of becoming extinct. Three elderly women still know how to make clay vessels but do so infrequently. The writer saw four vessels in the process of manufacture at Taquapirí in 1943. At that time there were no more than five or six clay pots in the whole village and there seemed to be little concern on the part of the villagers that no younger women were learning the pottery-making techniques.

[60] Similar wares have been found in southern Brazil but little published material exists. Most recently, Dr. Herbert Baldus of the Escola Livre de Sociología e Polítical of São Paulo, has collected sherds from a site (sites) in the state of Paraná. The writer of this paper had the opportunity to see photographs of some of these sherds in 1945. There was marked similarity to certain Guayra types, particularly the corrugated (which, at that time, at least, Baldus believed to be of other than digital impression), nail-incised, polychrome, and (I believe) plain sherds.

late prehistoric and historic times seem to have been predominantly Guaraní). Even today the Paraná exerts a powerful influence on the inhabitants of its valley, so that many Brazilians in southern Mato Grosso, for example, feel a somewhat closer tie to the Argentine provinces to the south than they do to neighboring Brazilian states.[61] And the well-developed Brazilian extractive industry of mate (*Ilex paraguayensis*) has infinitely closer ties with Argentina than with Brazil and sends the bulk of its product, extracted from southern Mato Grosso, down the river to Buenos Aires rather than cross-country to Rio de Janeiro.

It seems reasonable to suppose that excavation at Ciudad Real will shed light on the important problem of the effect on Guaraní culture of the impingement upon it of European culture. There do exist some references to this in historical sources. It should prove interesting to compare these with archaeological findings and to augment this written information. Ethnological studies, too, will be of great value in this region. Thus it would seem that Ciudad Real will be an important site insofar as cooperation between the archaeologist, ethnologist, and the ethno-historian is concerned.

Once again it should be mentioned that the material discussed herein not only is that collected from the surface of the site, but that it represents only one facet of the material culture—ceramics. The inadequacy of this type of material, of and by itself, is recognized. Excavation should give us a more complete knowledge of the material culture as well as (it is to be hoped) clues or suggestions as to other aspects of the culture. Until a complex of cultural traits can be studied, few important conclusions can be drawn.

Answers to the forementioned problems, as well as to those noted in other sections of the paper, depend not only on excavation of the Ciudad Real site but also on a greater knowledge of the archaeology of the Paraná Valley and neighboring areas. It is imperative that stratigraphic sequences be sought in an attempt to obtain a chronological picture of the area. When the area as a whole is better known, South American archaeological knowledge will be greatly enriched through the interweaving of this material with comparable data from surrounding areas.

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The University of Oklahoma
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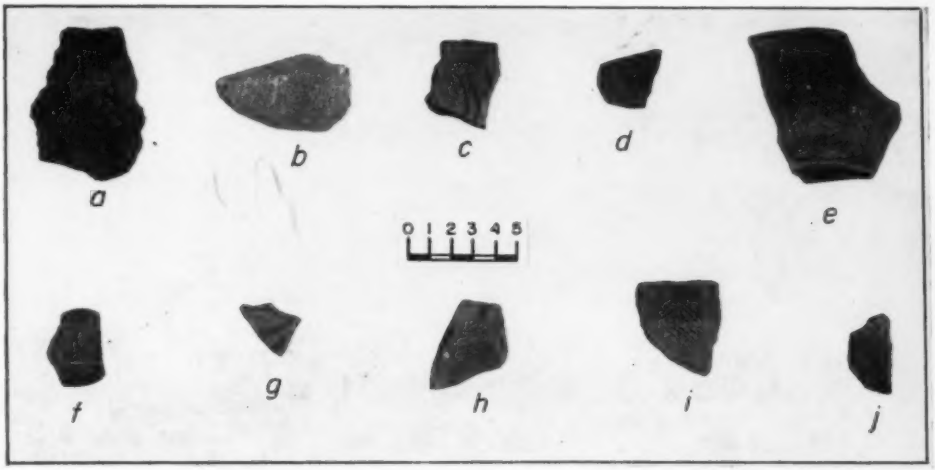
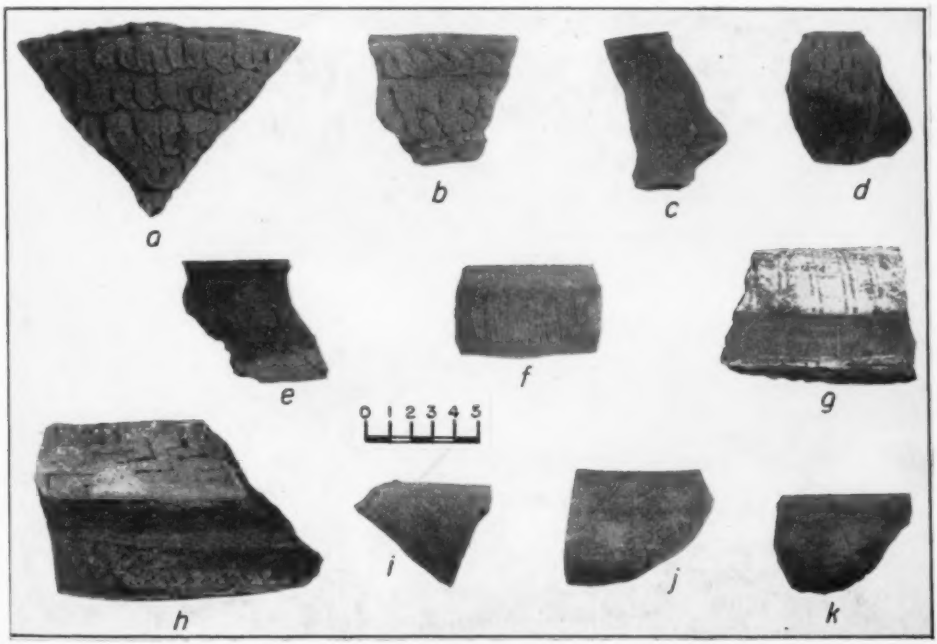
January, 1947

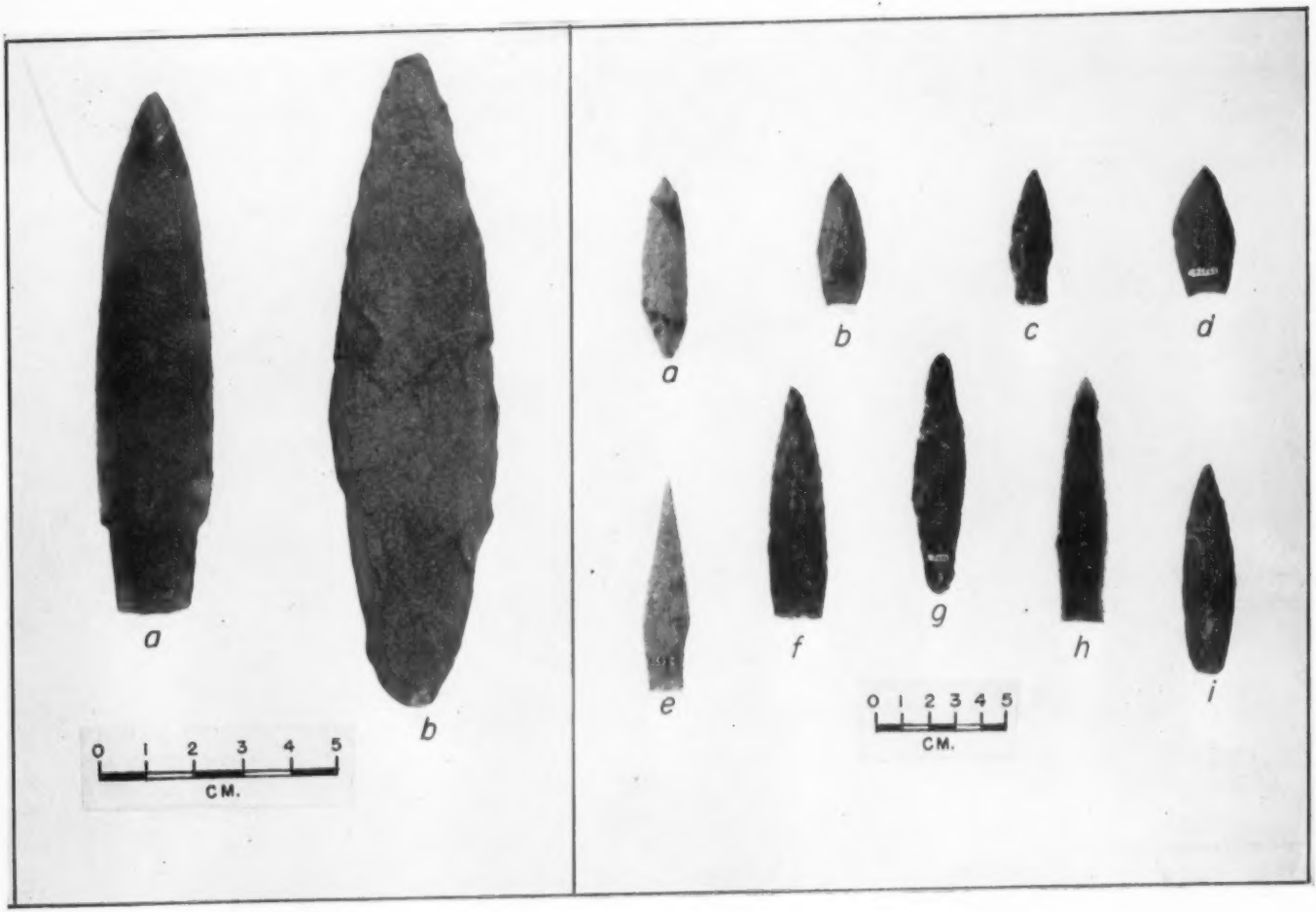



A




B

Potsherds from the Ciudad Real site, southern Brazil. A: *a*, nubbed; *b*, basketry impressed; *c, d, f–j*, incised; *e*, modern Paraguayan. B: *a*, *b*, Guayra corrugated; *c, d*, Guayra nail-incised; *e, f, i*, Guayra brushed; *g, h*, Guayra polychrome; *j, k*, Guayra plain.




A B

Oregon projectile points. A, points from the Templeton ranch, Willamette valley: *a*, Yuma-type point; *b*, Sandia-type point. B, points from Roaring Springs Cave (*a–e*, *h*), Fossil Lake (*f*), and Catlow Cave No. 1 (*g*, *i*), south central Oregon: *a*, Sandia-like; *b*, *d*, Folsom-like; *c*, *h*, *i*, Yuma-like.

# FACTS AND COMMENTS

## FURTHER INFORMATION ON PROJECTILE POINTS FROM OREGON

This communication will (1) report on two projectile points from Oregon and (2) call attention to others from south central Oregon caves which vary from the types usually found there and throughout the Great Basin.

The two projectile points, illustrated in Plate XVI, A, were turned into the Museum of Natural History, University of Oregon, by Mr. H. L. Robe, Museum Attendant, about 1938. The cataloger called the Yuma point to my attention but not the other. He informed me that the Yuma point had been found in an old slough in the Willamette Valley and on the basis of that information nothing was worth reporting about it since stratigraphic or associational sequence seemed to be lacking. It was interesting but that was all.

Several years later I took the matter up with Mr. Robe, who had found the point, to get all the information I could about it in an effort to run down all possible leads to Early Man in this region. Mr. Robe told me that he found another point at the same time close to this one and in addition some mammoth remains very close to them. The other point is the Sandia-like type in Plate XVI, A, *a*. Some tooth and bone fragments of the mammoth had been deposited in the Museum of Natural History at the University of Oregon at the time the points were turned in.

The story of the discovery of the points is as follows: Mr. Robe in the autumn of 1895 had gone to teach at the Kirt School after his graduation from the University of Oregon the previous June. (The Kirt School is about 1½ miles southwest of the locality where the points were found.) Robe had studied paleontology and geology at the University under Dr. Thomas Condon and used his free time to scour the country for fossils.

James Templeton then owned a ranch in Sec. 5, T. 14S, R3W, Willamette Meridian. The valley floor is pretty much of a low plain with insufficient slope to provide adequate drainage so that unless ditching is provided during the rainy season the area tends to become a bog, especially in the lower parts. About 3 miles to the northeast is the Calapooya River, and Muddy Creek is as far to the southwest. These two streams flow generally northwesterly, converging slightly. Both rise a few miles to the southeast in the western foothills of the Cascade Mountains. The area between these streams must have been a bog or had bog spots for a very long time, as is shown by the clay-like character of the soil.

About 1893 Templeton, in order to improve drainage, ran a plow several times through the length of a "sag" or slough so that the run-off from the winter rains would cut a channel and provide drainage to contain the water. This was effective, for in two years the channel had been cut to 6 or 7 feet below the top of the banks on either side. However, there had been a "sag" there before so this entire cutting was not done in the two years preceding the finding of the points.

Mr. Robe in the fall of 1895 after the opening of school went out on a fossil hunt and started down the then dry drainage ditch. Here he found several vertebra, a tooth, and a part of a mammoth tusk partly exposed after having been uncovered by the water running through the ditch the previous winter and spring. Careful search turned up the Yuma point close by the mammoth remains and the Sandia one 75–100 feet further northwest, but also in the bottom of the ditch.

In February, 1945, I sent the two points to Dr. Frank H. H. Roberts, Jr. for examination and his opinion on the types. Dr. Roberts examined the points and had the good fortune to be able to show them to Dr. Hibben, who was then on duty with the Navy in Washington. Dr. Roberts wrote under date of April 2, 1945,

> The one probably would be considered as a variant of the Collateral or Eden Valley type of Yuma.[1] In its general aspects it appears to be Yuma but I have not seen other examples where the sides of the tang tend to converge toward the base. On all of the specimens with which I am familiar the sides of the tang are approximately parallel and the offset is not as pronounced. Also, the fine secondary chipping along the edges of the blade is not common, although a few cases have been reported, I believe. Miss Wormington is better posted on that than I am, however, and she would be able to tell you more about it. You could well have a local variant of the type and the present specimen be designated as such. In the matter of its significance it would be well to compare it with some of the numerous California examples which are known to be very recent in origin. My experience has been that a Yuma type in itself doesn't mean much from the standpoint of age. If found in association with extinct animals or in a stratum of definite geologic age, it is a different story.
>
> The other point is interesting. The offset is so slight in comparison to that on the characteristic Sandia points that it might be questioned as having been intentional. The point is much larger than any of the specimens from Sandia Cave or of those found in the western Oklahoma Texas region. The chipping, however, is quite comparable, also the general appearance with respect to the nature of the stone and its weathering. Hibben said that if he found it in an arroyo bank in New Mexico he would be inclined to think it has Sandia affiliations, but that he would want something definite in the way of associations before concluding that it was.

Hibben recently in a report on "The First Thirty-Eight Sandia Points" accepts this one as genuine. He writes:

> It must be remarked that several tempting Sandia points were thrown out of these classifications because of uncertain origin. The crux of the matter is that the origin of the point is as indicative of its Sandia connection as are the characteristics of the flint itself. In other words, Sandia points are difficult to recognize out of context. It is entirely conceivable that comparatively modern points and knives may have, from time to time, assumed the side-notched characteristics of the Sandia form. In all thirty-eight instances of the Sandia points mentioned herein, circumstances indicated considerable antiquity. In fourteen instances, points were found with extinct bones, although in each case by amateurs. The other specimens were derived under circumstances which would indicate extreme antiquity, such as considerable depth below the surface. This, coupled with the characteristics of the points themselves, seems to justify putting them in the bone-fide class. One point in this category was a rather large piece found by Dr. L. S. Cressman under very suggestive circumstances in Oregon.[2]

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[1] H. M. Wormington, "Ancient Man in North America," *Popular Series, The Colorado Museum of Natural History*, No. 4, second (revised) edition, Colorado Springs, 1944.

[2] Frank C. Hibben, "The First Thirty-Eight Sandia Points," AMERICAN ANTIQUITY, Vol. 11, No. 4, 1946, p. 258. Hibben incorrectly attributes this find to me.

Oregon projectile points. A, points from the Templeton ranch, Willamette valley: *a*, Yuma-type point; *b*, Sandia-type point. *B*, points from Roaring Springs Cave (*a–e*, *h*), Fossil Lake (*f*), and Catlow Cave No. 1 (*g*, *i*), south central Oregon: *a*, Sandia-like; *b*, *d*, Folsom-like; *c*, *h*, *i*, Yuma-like.

Late in the summer of 1945, Robe, E. L. Furlong, Dr. W. D. Smith, head of the Department of Geology of the University of Oregon, and I went to the locality to examine the site and to determine if further excavation were warranted. There seemed to have been some recent silting of the channel from side and surface clays. The channel at the point where the remains were found is now about 25 feet wide and 6 to 7 feet deep. Further excavation in the heavy soil without specific evidence of remains would not be justified. The clay, at first grey and then blue-grey, strongly suggests an ancient bog. It was from the deeper blue-grey clay that the mammoth bones were being washed.

The Yuma-type point is made of a brown translucent chert. It gives the appearance of percussion chipping with pressure secondary flaking. At the point the instrument is well sharpened by excellent secondary flaking directed diagonally backward as shown in the illustration. The tang has been retouched along both sides and seems to have had the sharpened edges somewhat dulled.

The Sandia-type point is made either from very fine grain sandstone or hornfels, probably the latter. Weathering is marked. Flaking is the percussion type. Some effort at secondary chipping is evident along one side just in front of the shoulder on the under surface in the picture. In cross section across the short axis, the point is not bilaterally symmetrical, probably because of some defect in the stone. Outside of that section, the point is well made and the technique well controlled. Figure 34 shows a drawing of the short axis cross section as well as the outline of the point. The left side is turned up and the cross section drawn in that position.

I cannot establish the association of the points and the mammoth. However, it is obvious that the association is possible and in my opinion probable. I have reported a probable association only about 15–20 miles from this locality.[3] The two points are erratics in the styles for the valley. They are large points to use in hunting big animals. The system of "bog hunting" is characteristic of Early Man as shown at Folsom, Lindenmeier, Lower Klamath Lake in Oregon and elsewhere. The association is possible, interesting, and stimulating in some of the problems it suggests, but is unproven.

The points in Plate XVI, B are shown because they represent unusual or erratic types in the Great Basin area. I have called attention previously to approximations to Folsom-like types and to a tangless variety from the early level in Lower Klamath Lake.[4] All the points in Pl. XVI, B except *f* came from Catlow Cave No. 1 or Roaring Springs, while *f* was found at Fossil Lake by the father of one of my students, Charles Reetz, Jr., who loaned it to me for this report. Points *g* and *i* are from Catlow Cave No. 1. Points *a* and *e* are grey chert, *d* is brown chert, and the rest are black obsidian.

Since the characteristic type of points for the Northern Great Basin culture is a large corner-notched variety which persists down to late horizons in a reduced size, it seems worthwhile to present these aberrant forms.

Point *a* shows a side notch or shoulder strongly suggestive of the Sandia type. The dark patches on the stem below the shoulder are spots of pitch used in hafting. The brown diagonal streak near the point is a vein of brown chert. The shoulder does not seem to be the result of accident nor is there any defect in the stone which might have caused it. The point comes from the basketry level near the center of Roaring Springs Cave.

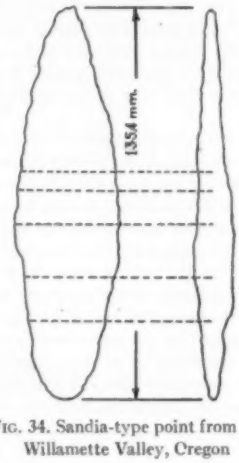



FIG. 34. Sandia-type point from the Willamette Valley, Oregon

Point *h* is strongly suggestive of a Yuma type, although modified. The shoulder is more pronounced on one side than the other. The edges are translucent so that the sharpness of outline is lost in the photograph. The base is broken. The edges along the base seem to have been slightly ground down. The flaking is diagonal and in cross section the shape of the points is a flattened diamond. The point came from close to the south wall of the Roaring Springs Cave in confused material and no stratigraphic position can be assigned to it.

Point *e*, having a constricted stem, ground edges, and a triangular blade, comes from the upper part of the basketry level in Roaring Springs Cave. Points *a* and *e* are unusual in another way besides shape since both are made of grey chert, a material only rarely found in the basketry-bearing level. Stratigraphically controlled points show that in the early non-basketry bed, while most points were made from obsidian, there was a larger percentage made from chert than in the upper level.

Points *c* and *i* came from the basketry-bearing levels of Roaring Springs and Catlow Cave No. 1 respectively.

[3] Cressman, L. S., "A Probable Association of Mammoth and Artifacts in the Willamette Valley, Oregon," AMERICAN ANTIQUITY, Vol. 6, 1941, pp. 339–42.

[4] L. S. Cressman, "Archaeological Survey of the Guano Valley Region in Southeastern Oregon," *Monograph Studies in Anthropology, University of Oregon*, No. 1, Eugene, 1936, p. 35, Pl. XI; L. S. Cressman, "Studies on Early Man in South Central Oregon," *Yearbook, Carnegie Institution of Washington*, No. 39, p. 304, Washington, 1938; L. S. Cressman "Archaeological Researches in the Northern Great Basin," *Publication Carnegie Institution of Washington*, No. 538, Figs. 94, *e*, 98, *a*, *b*, Washington, 1942.

Both are suggestive of certain aspects of the Yuma tradition.

Point *f*, the Fossil Lake specimen, has a slightly constricted stem but no well marked shoulders. The edges of the stem are dulled. The flaking is diagonal. The shape in cross section is a diamond for about two-thirds of the way to the base, when it flattens out.

Point *g*, from the basketry-bearing bed of Catlow Cave No. 1, may be a knife rather than a point but identification is uncertain.

Points *b* and *d* both come from the basketry-bearing level of Roaring Springs Cave. Point *d*, a brown chert, would have had a good Folsom outline had it not been for a defect in the material which apparently caused the incurving flake to break loose on the right edge. It lacks the channel flaking. Point *b* which seems to be a devitrified obsidian, has its greatest width too far toward the base to approximate closely a Folsom type outline. An uneven grain in the material has caused the flaking to be very uneven; the point is flat on one side and has a ridge on the other running slightly diagonally across the long axis from the base.

The lack of Folsom and Yuma horizons in the Great Basin is puzzling in view of the evident close contemporaneity of the cultures. Folsom and Yuma points always seem to be erratics in this area. There are approximations to both types as shown by the Ventana Cave and Cochise remains. These specimens from Oregon Caves and that from the Willamette Valley (Pl. XVI, A, *a*) are presented to call attention to approximations to both Yuma and Folsom types in an area of strikingly different patterns. They may be erratics brought in from outside the area, simple variations in forms, or products of a faintly remembered tradition which produced the superb Folsom and Yuma specimens. Their mixture with other types and the lack of definitive stratigraphic relationships, which one might expect if they were anything more than the product of the individual point maker's skill and inventiveness, makes their incidence here difficult to explain. Yet marked variations from the dominant type of point is not a commonly experienced phenomenon.

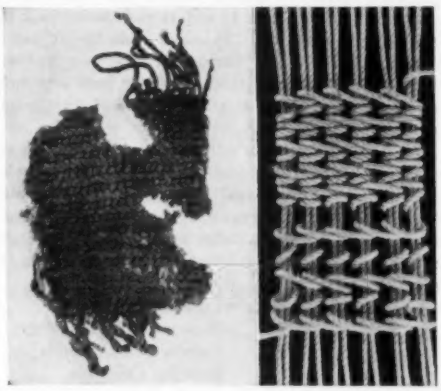
L. S. Cressman
University of Oregon
Eugene, Oregon

## NOTE ON AN *APOCYNUM* FABRIC

A textile specimen in the University of California Museum of Anthropology, perhaps to be identified as a sling pocket, adds a new item to the growing list of fabrications made of twisted dogbane fiber (*Apocynum cannabinum*). It is, moreover, constructed by a technique not to my knowledge previously reported.

I am indebted to Professor Robert F. Heizer for calling my attention to this unique object and for the following paragraphs placing it in its relation to Nevada archeology.

"The piece comes from a dry cave site (Humboldt Cave) in west central Nevada about 10 miles southwest of Lovelock Cave.[1] The cave was excavated in 1936 by the University of California Department of Anthropology, and the final report on the excavation is now nearly completed. Generally speaking, the cave did not yield clear evidence of cultural stratification, and is correlated, on the basis of artifact types recovered, with Transitional and Upper levels of Lovelock Cave. Throughout the cave's history *Apocynum* string was made and used for fish nets, fish lines, and for all the minor or occasional purposes for which native people use string. The piece described here by Dr O'Neale is unique to Humboldt Cave, and nothing similar was recovered from Lovelock Cave. The *Apocynum* piece may be, as Dr. O'Neale suggests, a sling pocket. The sling was known ethnographically, but as a toy and not a war or hunting weapon.



*a* *b*

Fig. 35. Textile specimen from Humboldt Cave, Nevada

"The modern Paviotso of the Humboldt Lake region call both the *Apocynum* plant, and the string made from it, *wiha*. The plant grew on the sloughs and river but not on the old lake shore. The dry plant was gathered in the fall, the bark stripped off, shredded, and rolled on the thigh with the palm. Its chief uses were for making rabbit, bird, or fish nets. String or twine was usually two-strand and twisted to the left (counterclockwise) while rope was ordinarily twisted to the right (clockwise)."

Specimen 1-43774 (Fig. 35, *a*) measures over-all 12 cm. by 6 cm. Exclusive of the fringe loops at each end, which vary in length from 1.5 cm. to 2.5 cm., the center section roughly measures 7 cm. by 6 cm.

The technique is wrapped weave over a foundation of cords of the same diameter and formation as the wrapping element. The cords, which serve as warps in pairs, total 50; the courses of wrap weave total 30. Because the warp-element loops at the ends are not equal lengths, each loop appears to have been held taut by means of a small object such as a stake. Had the loops been made to encircle bars as in loom weaving, the lengths would have been uniform.

[1] L. L. Loud, and M. R. Harrington, "Lovelock Cave," *University of California Publications in American Archaeology and Ethnology*, Vol. 25, No. 1, Berkeley, 1929.

The technique (Fig. 35, *b*) was reconstructed according to the following procedure: alternate courses of the wrapping element are designated as odd-numbered and even-numbered courses. Two changes complete the unit of repeat.

1. Odd courses: wrapping element was carried from left to right over Warps 1, 2, 3, 4 and was passed back to left under Warps 4 and 3; wrapping element was carried again to right over Warps 3, 4, 5, 6 and was passed back to left under Warps 6 and 5. This rhythm of over four, back under two was continued without change to warps 9, 10, 11, 12 on the right edge of the reconstruction.

2. Even courses: wrapping element was passed from right to left under Warps 12 and 11 and carried back to right over Warps 11 and 12; passed again to left under Warps 12, 11, 10, 9 and was carried back to right over Warps 9 and 10. This rhythm under four, back over two is the opposite of that maintained for the odd-numbered courses.

The *Apocynum* cord is a two-ply cord with S-twist (spiral to left), hard spun (angle approx. 35°). Each ply is a two-ply S-twist cord, also hard spun. One of these ply is a very fine cord, the other is appreciably heavier. The difference in diameters is visible to the naked eye. Both singles are Z-twist elements (spiral to right), medium-hard spun. Total number singles in cord, eight.

LILA M. O'NEALE
Museum of Anthropology
University of California
Berkeley, California
March, 1947

## PICTOGRAPHS FROM TRAMPING LAKE, MANITOBA

In presenting the accompanying sketches and observations, it must be stated that they were taken from a layman's viewpoint, and some significant details may have been omitted in one or two instances. Data were not collected with the thought of scientific publication, but since it is believed there has been no previous recording of Indian pictographs from a locality as far north in Manitoba as the occurrence here described, the following brief observations are presented at the suggestion of Dr. Douglas Leechman of the National Museum of Canada, Ottawa.

The pictographs occur on the west side of the north arm of Tramping Lake, Manitoba (Fig. 36). They are about one mile north of the wide part of Tramping Lake, at approximately 54°43′ N. latitude and 100°05′ W. longitude. Tramping Lake lies between Wekusko (Herb) Lake on the east and Reed Lake on the west and is a portion of the Grass River system, one of the early canoe routes of the area. Peter Pond has referred to this canoe route on his map, dated 1785, as the "middle road to Hudson's Bay."

The paintings are on the spalled-off and jointed face of a granite cliff about 12 feet in height which dips vertically into the waters of Tramping Lake. Some of the lower pictographs were probably painted from a canoe, while jointing ledges in the granite provided a natural scaffolding for paintings higher up the cliff face. They occur erratically over an area of probably 150 to 200 square feet. They were painted with red ochre which is now quite faded and, in many places, difficult to distinguish. A sparse lichen growth has obscured a minor part of the paintings.

Identifiable pictographs include moose, bird, fish, bison, thunderbird, and horned serpent (Figs. 37–39). There is

FIG. 36. Map of Manitoba, showing the location of the Tramping Lake pictographs.

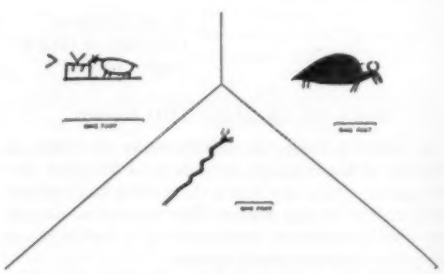


FIG. 37. Pictographs, Tramping Lake, Manitoba.

also a painting of a man apparently leading an animal resembling a horse, but the bifurcate nature of the latter's feet would suggest a cloven-hoofed animal. A sketch was not made of this in the field and, unfortunately, a photograph taken of it was unsatisfactory. The accompanying

sketch was made from the identifiable portion of the photograph. Dr. G. Gjessing of the Institute for Comparative Research in Human Cultures, Oslo, Norway, has suggested

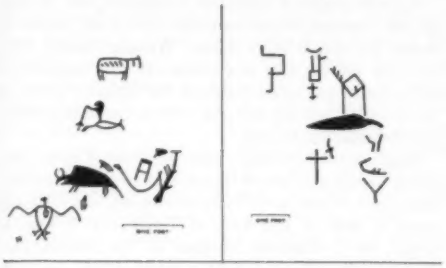


FIG. 38. Pictographs, Tramping Lake, Manitoba.

FIG. 39. Pictograph, Tramping Lake, Manitoba.

that a trap of some kind is possibly represented by the box-like structure approached by a moose in one of the pictographs. In addition to the above paintings there were numerous angular, straight-line geometrical designs, and several positive hand imprints.

M. S. STANTON
Winnipeg, Manitoba
March, 1947

## A UNIQUE SPECIMEN OF PRESSURE-FLAKED PYRITE FROM ST. LAWRENCE ISLAND, ALASKA

Attention is invited to a unique flaked pyrite object from the ancient village of Miyowaghameet, St. Lawrence Island, Alaska. While specimens of unworked pyrite and certain pyrite-studded artifacts[1] have been found at this and other Arctic sites, the specimen illustrated (Fig. 40) is, to the best of our knowledge, the only object of pressure-flaked iron pyrite reported from St. Lawrence Island and possibly from the Arctic coastal sites.

Miyowaghameet lies in a gravelly plain at the foot of Cape Chibukak, approximately one mile east of the Eskimo village of Gambell. Collins gives the average diameter for the site as one hundred yards;[2] however the long axis runs roughly NE/SW, and the specimen herein described, while located within the eastern half of the midden, was found approximately sixty-five yards from the eastern edge.

The specimen was found at a depth of forty inches and in the general horizon of Punuk type harpoon heads, including Punuk type F.[3] Further digging at the time of discovery was not possible because of frozen ground, and when the native returned later to dig deeper, nothing was encountered. Since the artifact was found with other fragmentary objects, bits of chipped ivory, wood, and a large amount of animal bones, it appears likely that it had been discarded in a refuse heap.

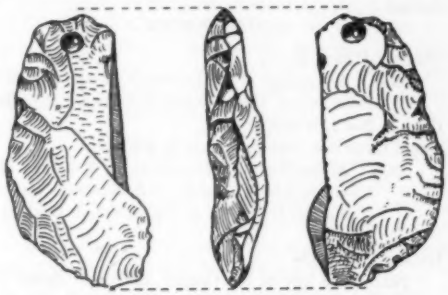


FIG. 40. Pyrite from St. Lawrence Island, Alaska.

Louis Giddings and Ivar Skarland of the Department of Anthropology, University of Alaska, have examined the specimen and report that although the University has in its collections a large number of inset pyrite pieces as well as unworked pieces probably used in striking fire,[4] the artifact illustrated is unique as a specimen of pressure-flaked pyrite. In their opinion the piece was originally fashioned as an end scraper and after it had become fractured, it was kept as an amulet. Weyer writes[5] that the natives of Cumberland Sound impute to pyrite the power to drive away spirits.

Accepting the premise that the specimen was used as an amulet, drilling was probably done after it had become broken and in preparation for its use as a charm, inasmuch as a drilled hole would have served no practical purpose in its original use as a scraper. Attention is called to the shape of the hole which indicates that drilling was done with an instrument that formed a cone-shaped hole and necessitated drilling inward from both sides. Drilling could have been accomplished with either metal or stone.

According to the mineralogical report on St. Lawrence Island included in the Geist-Rainey monograph,[6] pyrite has been reported from the granitic area near the west end of the island. We are unable to state definitely whether or not this pyrite specimen is native to the island or if it represents a trade object.

[1] Collins, 1937, pp. 243, 361.

[2] Collins, 1937, p. 56.
[3] Geist and Rainey, 1936, p. 175, Fig. 23.
[4] Jenness, 1922, pp. 108, 139; Weyer, 1932, p. 70.
[5] Weyer, 1932, p. 313.
[6] Geist and Rainey, 1936, p. 9.

In considering the pyrite-studded ear ornaments from the Punuk and Kukulik middens (the latter excavated by Geist), Collins writes that they are foreign to the St. Lawrence culture as a whole and are no doubt sporadic importations.[7] It may be of interest to note that the writers obtained one such rectangular, pyrite-inset ear ornament from the Miyowaghameet site, thus making three St. Lawrence Island sites from which these artifacts have been found.

In conclusion we would particularly welcome correspondence on the subject of pressure-flaked pyrite specimens as a re-check of publications at hand does not indicate that specimens of like nature and manufacture have been described.

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[7] Collins, 1937, pp. 243, 361; Nelson, 1899, p. 53, Pl. XXV.

## COMMENTS ON A SITE IN THE ST. MARKS NATIONAL WILDLIFE REFUGE, WAKULLA COUNTY, FLORIDA

In a recent issue of AMERICAN ANTIQUITY John M. Goggin has described certain materials from a site in the St. Marks National Wildlife Refuge, Wakulla County, Florida.[1] The present note is a continuation of Goggin's remarks, based on certain materials not available to him at the time of his writing, and on a more recent surface collection of sherds from the site.

Goggin mentions a copper plate ornamented by incision, having human and animal figures depicted on the surface, which he had not seen. When this object was originally found in 1938 by Bill Kary of Tallahassee, it was examined by J. Clarence Simpson of the Florida Geological Survey. Simpson made a cast of the object, as well as a detailed drawing. The drawing reproduced in this note (Fig. 41, *b*) was made from Simpson's sketch and a copy of the cast in the possession of Dr. Mark F. Boyd of Tallahassee. The writer is grateful to both of these gentlemen for the use of their material.

The copper plate is about 15 cm. in length and roughly triangular in form; its thickness cannot be ascertained from the available evidence although it is said to be "thin." It is obviously cut from a larger plate which bore the human and animal delineations. It will be noted that the human figure, cut off below the waist, is dressed in European costume, wearing sandals and knee-length pantaloons. The rampant animal figure has only the head missing. A horn projects from the head of the animal near the very edge of the plate in its present form. Reworking has obscured the precise delination of this horn, but it would appear to have been pronged, making the animal appear to be a stag. Were it not for this feature, and the general size of the creature in relation to the human figure, the delineation would seem goat-like. The very obvious phallus of the animal is strikingly human, even to the representation of circumcision. The crescentic incision behind the human is not identifiable in its present form.

At the time of the aboriginal reworking of the larger

[1] John M. Goggin, "Manifestations of a South Florida Cult in Northwestern Florida," AMERICAN ANTIQUITY, Vol. 12, pp. 273–6. The site in question is numbered Wk 11 in the Florida Park Service Archaeological Survey.

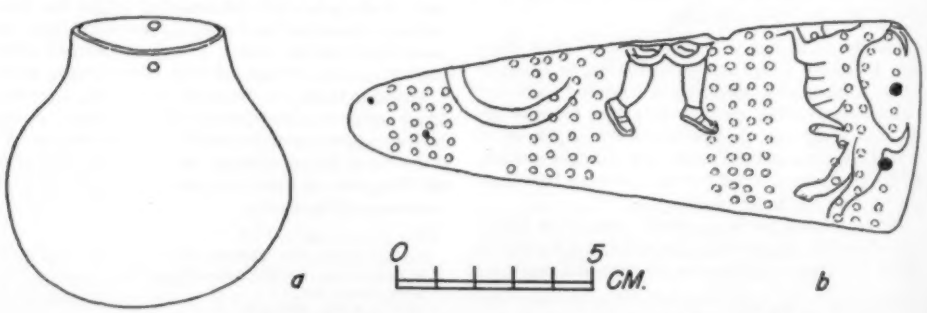


FIG. 41. Specimens from the St. Marks National Wildlife Refuge, Wakulla County, Florida.

plate into its triangular form, four bands of decorative punctates were added and are shown as light, broken circles in the sketch. The punctation was done from the reverse side so that the punctates appear as small nodes rather than depressions on the side figured. Patterning is evident in these bands of punctates, and they no doubt provided the decorative motif at the time of its use as a pendant. The entire piece has taken on a wavy appearance from the bands of punctates, the punctated areas being higher than the plain bands on the side shown. Four perforations are indicated by solid black dots in the figure: two near the apex of the triangle are small and irregular in execution and placement; two at the other end are larger and more regular, and doubtless represent suspension holes for the pendant.

The sherd collection made by Goggin, Smith, and the writer in the summer of 1946, was, as Goggin has indicated, largely undefinitive. Possible examples of Wakulla Check Stamped, Swift Creek Complicated Stamped, and several punctated sherds which are possibly Fort Walton in affiliation were all that were found.[2] In May, 1947 the site was revisited by the writer, and a larger collection of surface sherds was made. The more recent collection included, in addition, four definite examples of Fort Walton Incised and a small sherd which would seem to have its closest affiliations with the type Carrabelle Punctated. As Goggin has previously noted, the first collection could relate to Santa Rosa-Swift Creek and Weeden Island times; the addition of the Carrabelle Punctated-like sherd strengthens the Weeden Island affiliations to some extent. The finding of the Fort Walton Incised sherds provides a positive indication of the Fort Walton period at the site, and renders the site less confusing inasmuch as this is the horizon with which one expects to find historic material on the northwest coast.

A small, plain vessel, with two holes for suspension, was found by Bill Kary in 1938 at the same time that the other objects were recovered. It is shown in Figure 41, *a*.

The midden site, Wk 2, adjacent to the cemetery site, Wk 11, continues to yield only types of periods prior to Fort Walton. Our first collections contained only plain pottery, linear check-stamped pottery, and Swift Creek Complicated Stamped (?) pottery. The more recent collection by the writer, in addition to plain pottery, contains cord-marked pottery, definite sherds of Swift Creek Complicated Stamped and Crooked River Complicated Stamped. Tentatively, this midden would seem to date from Santa Rosa-Swift Creek and Weeden Island times, with Fort Walton not being represented.

Present evidence would seem to indicate that the area of both the midden site, Wk 2, and the cemetery site, Wk 11, was occupied in Santa Rosa-Swift Creek and Weeden Island times, and that the site of the cemetery also shows evidence of Fort Walton times. Although no actual association between the Fort Walton materials and the metal objects and historic goods can be demonstrated at the moment, it appears likely that they do go together. If the metal objects do belong with the Fort Walton pottery, we have evidence at this site of cult materials characteristic of southern Florida present in northwestern Florida in association with a ceramic tradition distinctly different from that with which they occur in the Glades Area. Goggin's alternatives, that the South Florida artifacts represent mere trade of metal objects or that they indicate the presence of a South Florida cult in northwestern Florida, still stand.[3]

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May 1947

[1] The pottery types used in this note have been briefly described and figured by Willey and Woodbury. Gordon R. Willey and R. B. Woodbury, "A Chronological Outline for the Northwest Florida Coast," AMERICAN ANTIQUITY, Vol. 7, pp. 232–54, 1942.

[2] Since this note was written David O. True of Miami has found a manuscript of William W. Kary describing excavations at the site, which had been mislaid in his files. Mr. True turned this over to John M. Goggin, who forwarded it to me.

According to this manuscript, burials at the site were mostly extended, although some were flexed. The articles mentioned both in this note and in Goggin's were associated with burials. Among the pottery was a vessel which was apparently Ft. Walton Incised; check-stamped sherds were abundant. Aboriginal artifacts included "a beautiful polished ceremonial ax," three polished stone discoidals, two polished stone pendants, one of quartz crystal, a large elbow pipe with incised designs, shell objects, and finely made projectile points.

This manuscript seems to remove any doubts concerning the association of the metal objects and Ft. Walton material.

# BOOK REVIEWS

*Indians Before Columbus.* PAUL S. MARTIN, GEORGE I. QUIMBY, AND DONALD COLLIER. Chicago: University of Chicago Press, 1947. 582 pp., 122 illustrations, $6.00.

According to the authors of this very important contribution to North American archaeology, it was written "for the interested layman and for students taking introductory courses in anthropology . . . not as a general reference book for professional anthropologists." To the reviewer, it seems that here may be a contradiction which will puzzle many readers, both amateur and professional. The first two sections, on the New World aboriginal background and its arts and industries, were obviously written for the beginner and the interested layman. On the other hand, the remainder and by far the greater part of the book consists of a systematic presentation of selected but very extensive culture sequences in four of the major archaeological areas north of Mexico. The great bulk of this scientific data has been acquired in quite recent years and its well organized presentation here should have great comparative value for professionals who rarely know more than a few regions intensively. However, for the beginning student and amateur, the very abundance of these newly acquired archaeological materials, the necessarily repetitious discussion of artifact types, and the fact that the authors have scattered their theoretical conclusions throughout the body of their report, rather than drawing them together in a comprehensive conclusion, would all seem to militate against rapid, popular acceptance. However, time and sales often laugh at reviewers and one hopes that here, particularly, this may be the case. This is a very timely and much needed book, with excellent and well selected plates, figures, charts, glossary, index, and bibliography. It is also the first specific survey of North American archaeology published during the last twenty-five years.

Since this review is written primarily for professionals, little need be said about the first two sections (Parts I and II) which, in a sense, are a brief, modernized summary of W. H. Holmes' "Introduction" to a "Handbook of Aboriginal American Antiquities," published by the Bureau of American Ethnology in 1919. Part III considers "The Earliest Indian"; Part IV "The Southwest"; Part V "Eastern North America" (divided into eleven sub-areas); Part VI "The Pacific Slope," Part VII "The Far North"; and Part VIII is a very brief "Conclusion." Thus, north of the Rio Grande, all of North America is considered, with the exception of the interior regions of Alaska and northern and eastern Canada, where as yet the archaeological record has very little to offer.

In regard to the antiquity of man in North America the present trio of authors allows "no more than 20,000 years" and regards itself as being conservative in dealing with this puzzling problem of correlating geological "dates" with archaeological sequences. It is noteworthy that perhaps ninety-five per cent of the cultures with which they deal fall within the Christian era, whereas the remaining five per cent rattle around in a somewhat haphazard manner over another 13,000 years (Fig. 122) or 18,000 years if the above maximum date is to be considered seriously. In actuality, 10,000 B.C. seems their minimal dating for Cochise (early stages), Sandia, and Folsom (p. 92 ), and like other very serious students, they are puzzled regarding the 10,000 year period between this and A.D. 1, a tentative date for the earlier northern agricultural horizons.

This gap is now filled to some degree by the various, not too well known Cochise stages, the Ventana Cave deposits, and the Hohokam-Mogollon culture sequence in the Southwest. However, in the Great Plains, the authors postulate a gap of some 10,000 years (as long as the combined Mesolithic and Neolithic periods in Europe!) between the Folsom horizon and what they call the "Old Signal Butte" horizon. To the reviewer, this appears absurd, particularly since the Eastern Archaic cultures are put forward as direct derivatives from the Folsom and Cochise horizons. The trouble seems to arise from an attempt to reconcile both the absolute time estimates of a few geologists and the relative culture sequences of many archaeologists. The former estimates may be too long or the latter incomplete, but, to the present, the two have not been reconciled in any very convincing manner. The dilemma here, as is usual, is masked by the totally different cultural and geological time scales employed on the same chart, where space dimensions are inverted as between the *short* temporal but culturally crowded post-Christian, and the very *long* temporal but culturally starved post-Pleistocene and pre-Christian eras in the New World. The present authors make a very fair-minded attempt, but a close study of their charts and text will show many discrepancies. Apparently these amazing discrepancies can only be resolved by closer understanding of the degree of actual objectivity attained, and the exact methodologies employed, by both the geologist and the archaeologist. In the meantime, the archaeologist who is, above all, a student of culture change in time, might do well to emphasize those evidences of typological sequence revealed by the cultural materials themselves. In this way he can supplement, rather than merely lean upon, the dendrochronologist and the geologist.

Concerning agricultural origins the present authors favor an independent origin in the New World, occurring slightly less than three thousand years ago, with the cultivation of maize originating in South America. To the north, Hohokam agriculture is believed to have been introduced into the Southwest just prior to the time of Christ and, in the Southeast, Tchefuncte agriculture is tentatively dated at about A.D. 700 (Fig. 122).

In the Southwest section there are excellent brief summaries of the Anasazi, Hohokam, and the Mogollon-Mimbres cultures. In regard to dating it should be noted that the Hohokam dates follow Gladwin's earlier and longer, not his later, shorter, time estimates. On the basis of various associations it is believed that Mogollon pottery-making precedes that of the Basket Makers. In regard to the latter the continuity of Basket Maker-Anasazi physical type and culture is emphasized. The major cause for the abandonment of the great towns of Pueblo III times is based upon

"internal disintegration" rather than drouth, war, or epidemic. To the reviewer, this attempt to solve one of the major problems of Pueblo history in terms of "a study of Pueblo social organization" is very interesting. It calls to the aid of archaeology the inductions of ethnology. However, since the amalgamation of smaller into larger groups continued throughout Pueblo history, despite ever present examples of fission, one feels that this analysis should be carried further. Regarding the Hohokam, the authors, on the basis of the distribution of San Francisco Red ware think that the Mogollon culture is equally old. They derive Classic Hohokam from the influence of the intrusive Salado peoples on the older Hohokam culture and postulate a considerable period of time when these two quite different cultures existed peacefully side by side in the same area, then split and went their separate ways. The great houses of late Classic times are attributed to Salado influence, but here, as in the monographic literature, there is no presentation of settlement pattern data which might throw clear light on the dynamics of this strange cultural process. From this Hohokam-Salado fusion and separation it is believed that the historic Pima culture arose, another vital historic connection still awaiting clear elucidation. The Mogollon culture, it is believed, was directly derived from the San Pedro stage of the Cochise culture, underwent gradual independent development and then, strongly influenced by the Anasazi-Hohokam cultures, passed into the Mimbres and Chihuahua phases where the Salado-Mimbres and Mogollon cultures blended. Perhaps, the authors say, this blend, which disappeared before the advent of the Spanish, created the historic Tarahumare culture. Cultural manifestations peripheral to the Southwest, such as the Big Bend, Ozark Bluff Dweller, as well as the later Gypsum Cave and similar cultures, were probably derived from a basic culture similar to, but not specifically like, that of the Basket Makers. The unique Promontory Point culture of Utah is suggested as a possible ancestor to the historic Navaho. In this section, as elsewhere, brief, but valuable ecological and thumbnail physical anthropological sketches are given prior to cultural analysis.

Following Kroeber, eastern North America is regarded as one major cultural area, but is divided into eleven archeological sub-areas. The major cultural developments in this potentially rich region fall into four stages: (1) from early post-glacial times to A.D. 500–700, a Folsom-Yuma-Cochise-like culture; (2) from A.D. 700 to 900, a time marked by the beginnings of ceramic manufacture and agriculture; (3) from A.D. 900–1300, a period of florescence wherein class distinctions, labor specialization, trade, and elaborate death rites developed in some areas; and (4) from 1300 A.D. to 1700, a period when great temple mounds, fortifications, large towns, and the specific characteristics of the Southern Death Cult developed. In regard to the origin of ceramics, two sources are postulated: conical based, cord-marked, and stamped pottery from northeastern Asia; and the fiber-tempered and, later, well modeled and painted pottery from Middle America. These two ceramic types are believed to have appeared at the same time in northern North America and to have blended. Agriculture is believed to have reached eastern North America from the south in the second eastern stage, producing an economic revolution. From this developed the third or florescent stage when numerous eastern groups acquired a spectacular and well integrated civilization. This civilization, presumably, passed on into an even more complex fourth and historic stage of "village states." However, other students (for example, Ford and Willey, *American Anthropologist*, Vol. 43, pp. 325–363, 1941) regard this last as a period of tribal breakdown and cultural disintegration. Whatever else may have been accomplished by the Works Progress Administration and similar governmental activities of the later 1930's, their contributions to a knowledge of eastern prehistory are outstanding, and it is this recent evidence which the present book (along with other recent summaries by Ford and Willey, Griffin, and Krieger) presents in clear outline form. Interpretations are still varied but the basic material is very rich and is increasing every day.

It is impossible within the bounds of a review to do more than touch on certain generalizations or particularly controversial points raised in the discussion of the eleven subareas here defined and outlined for the eastern United States. In the Northeast, the early occurrence of a heavy copper tool industry as well as an Eskimo-like ground slate industry still challenge full explanation. It is suggested that these occurrences are linked with the early appearance of pottery in the Lamoka stage as indirect borrowings from northeastern Asia. This may be so but the routes and sources remain to be clarified. Similarly, the origins of Iroquois culture are still obscure in regard to their Owasco, northern Ohio, or southeastern sources. It is suggested that the falling off in artifact types in the late prehistoric may have been due to cultural "climax" conditions beyond the reach of archaeological techniques. Perhaps so, but a general summary of the Northeast in relation to the East as a whole, combined with a knowledge of the Iroquois confederacy, indicates widespread militaristic developments accompanied by cultural decline which are equally discernible through either ethnological or archaeological perspective.

In the Ohio region, the Archaic (Indian Knoll culture) based on river clams and hunting is said to have been derived from a culture analogous to Cochise and Folsom, the earlier stages of which are postulated as at least 9000 years earlier in the Plains and the Southwest! The reviewer does not object to these obviously highly tentative cultural correlations between East and West; he merely finds the time correlation as given here highly improbable. After the Archaic, there is said to have been a break followed by the Adena culture, brought in by "round heads" who made huge burial mounds and traded widely in exotic materials. Following Adena in this region, came the Hopewell peoples whom, the authors believe, may well have progressed from an earlier village-state organization to that of a widespread confederation. Certainly their florescent burial cult and wide contacts would seem to mark a definite culture climax. As the best metal workers in aboriginal North America they arouse wonder and admiration. The occurrence of panpipes alone sets the Meso-Americanist looking to the south, unless the long-headed Hopewellians had also added other traits from southeast Asia to their cord-marked pottery, said to come from northeastern Asia. Concerning

the Marksville culture to the south, the authors compare this to the modern situation of an industrial North and more backward agricultural South. The reviewer suspects that earlier time and southern origins, not cultural lag, are involved here, but more exact dating will be necessary to prove this. However this may be, the authors see possible derivation of both historic Huron, Erie, and possibly other ancestral Iroquoian tribes out of the combination of Hopewell and Woodland cultures. Later than the Hopewell "Golden Age" are the Fort Ancient and other Middle Mississippi cultures in this area. This is thought to be the period of "City States," "when the cultures of the great Middle Mississippi Confederacy were expanding and bringing joy and cultural refinement to the barbarians of the wilderness." It is further suggested that the late Fort Ancient people were possibly the Algonkian Shawnee. It must already be obvious that, while the concluding section of the present book is brief, there are numerous highly important and often controversial conclusions suggested throughout the text.

A Folsom-like substratum is indicated for both the Faulkner and the Baumer cultures in the Illinois sub-area. Here again, either the time estimates for these cultures are much too late (A.D. 500 to 1000) or else the Plains' Folsom dates (10,000–20,000 B.C.) are much, much too early. At Cahokia and Kincaid in Illinois, and Aztalan in Wisconsin, the post-Hopewellian, Middle Mississippi cultures achieve isolated but remarkable and extensive cultural climaxes in this general region. In the Wisconsin-Minnesota sub-area, the Early Archaic is given an unusually wide latitude of time, the eight artifacts associated with Browns Valley "man" being dated as "sometime between 10,000 B.C. and perhaps A.D. 100." Typologically, these eight artifacts closely link Folsom, Yuma, and Signal Butte I, and it seems absurd to stretch them over 10,100 years. Here, particularly, one wishes the authors had emphasized typological similarities instead of trying to straddle geologically ordained datings. Within this sub-area in the so-called "Archaic" period, the "Old Copper Culture," with its heavy, socketed and utilitarian implements, is a fascinating puzzle. The authors, as a guess, suggest its origin from an early hunting Indian group with a culture similar to that of the Cape Dorset Eskimo that had hammered out float copper to replace implements of stone and bone. Until more convincing evidence as to the exact provenience and early dating of all this "Old Copper Culture" material is at hand, the reviewer would not rule out the possibilities of Norse origin for certain of these artifacts, along lines suggested in another connection by the present authors (p. 509). Further investigations might well consider this copper culture and mound association in Wisconsin with similar rock cairn, mound, and copper artifact associations as yet inadequately reported on for the lower Northwest Coast in the vicinity of the Fraser River. This is speculation. Less speculative, but still open to positive proof, are the authors' suggested correlations between the Mille Lacs culture and the historic Dakota, the Keshena culture and the Menominee and Chippewa, and the Clam River culture and the Santee Dakota. All these are possible, even probable, but available documentary and excavation evidences of historic or protohistoric association are as yet slim.

In general, historic and protohistoric cultures seem to be less frequently described in this book than are prehistoric horizons. This is understandable considering the great number of historic tribes whose material cultural remains are now becoming known. A complete inventory of these, however, would not only objectively link archaeology with ethnology and prehistory with history, but would double the size of the present book. However, in the light of the rather casual tribal identifications cited immediately above and the statement for the Great Plains that there are some additional cultures not described, including "the Lower Loup culture (Pawnee); the Paint Creek culture (Wichita?); and the Arvilla, Mandan, Mill Creek, Antelope Creek, and Oneota" (p. 333), to which should also be added historic Arikara, Hidatsa, Cheyenne, Omaha, Kansas, and Osage, one realizes that a separate volume on these newly described and culturally important historic and protohistoric cultures might well be in order. However, the present authors have probably presented as fair a sampling for the Great Plains as elsewhere, including the Dismal River, Nebraska, Upper Republican, Kansas Hopewell, Mira Creek, Sterns Creek, and "Old Signal Butte" cultures. The terminal dating on both Upper Republican and Nebraska cultures seems late (A.D. 1600 and 1650, respectively), since in neither case have post-1540 contact materials been found. In regard to Upper Republican and other Plains and Pueblo contacts in the Texas and Oklahoma panhandles, the present treatment is inadequate, but that gap has recently been discussed by both Wedel and Krieger. To the reviewer, the major flaw in the present section on the Great Plains is the ignoring of Signal Butte II and the assignment of Signal Butte I ("Old Signal Butte") to the Eastern Archaic rather than to the preceramic Plains sequence where it would seem to belong. In all probability this horizon and a number of the early Eastern Archaic lithic horizons are culturally very close, but so, typologically is Signal Butte I to the entire Lindenmeier-Folsom cultural complex. To separate these last two cultures by 10,000 years, and then, to derive the early Eastern Archaic from the Folsom horizon makes no sense at all. The geological-archaeological dating dilemma leading to such an impasse has already been mentioned.

Concerning the Ozark Plateau sub-area the authors suggest the derivation of the pre-agricultural Bluff Dweller horizon from a Basket Maker-like pattern of life which was widespread in North America among, perhaps, all Indians of the Early Hunting Stage. They suggest that this pattern might well be Asiatic in origin. This is a challenging conception, making one wonder from what Asiatic area and culture stratum it might have been derived. It is of interest that the authors suggest the old weed-seed cultivation in this region may have originated only after the cultivators had learned of Meso-American plant introductions in the Southwest. The reviewer favors Linton's earlier theory predicating a pre-maize-squash-beans agriculture based on local plants in this area; but, unfortunately, good sequential evidence in this regard from Arkansas and elsewhere is still not available.

The important Middle Southern Area discussion includes a brief treatment of the Southern Death Cult. Culture in this area is believed to have sprung from a Folsom-

Cochise base. Evidence on this seems obscure but such influences are believed to have been incorporated into the Lauderdale shell mound culture ("probably before A.D. 500"), which was followed by the Alexander culture which had pottery and possibly introduced agriculture. The Candy Creek culture followed, succeeded by the Hamilton culture; the former is believed to have introduced the use of limestone pottery temper to the Adena and Hopewell cultures. Parallel in growth to the Hamilton culture the authors place the Copena culture, which not only had elaborate, unpainted pottery, copper axes and elaborate copper ornaments, but, also, Folsomoid grooved points. (Since Copena is dated A.D. 900–1300 this makes the fluted point in northern Alabama at least 11,000 years later than the date here assigned to its Folsom prototype in the Great Plains!). Copena culture was apparently closely related to Hopewell, Troyville, and the late Adena cultures.

This was followed by various phases of the rich Middle Mississippi culture of the "Temple Mound Period" (*ca.* A.D. 1300–1700). This was a time of large village or city states with impressive, mound-plaza, ceremonial centers, complex shell-tempered pottery, elaborate ceremonial objects, a rich burial cult, and an economy based on intensive river-bottom agriculture. This is regarded as one of the most widespread and rapidly developing native North American civilizations, deriving its impetus both from Hopewellian inheritance and Middle American diffusion. Its carriers were apparently composed of many tribes and linguistic stocks. This was also the period of the Southern Death Cult which found rich expression at Moundsville, Etowah, Lamar, Spiro, and elsewhere. The authors believe, with Griffin, that this cult may have been set off by the DeLuna expedition of 1559. This has been disputed by Krieger and others. The present authors see direct Mexican influence in the art of the Southern cult but make no specific comparisons. They believe that this brief American renaissance ended by 1680, ushering in a period of steady cultural and population decline. An interesting comparison of the similar basic patterns of Middle Mississippi culture and modern rural southern institutions concludes this section (pp. 367–368).

The next two sections sum up the Georgia and Florida sub-areas. There is much of particular interest in these sections but only a few points can be mentioned here. The major trends of culture growth and change in these sub-areas are reported as generally similar to the above. Particularly interesting to one who knows the semi-sedentary Plains Indians is the description of the ceremonial earth lodge of the Macon Plateau culture (A.D. 1300–1600). The exact orientation and arrangement of the lodge, with its altar and four central posts, immediately brings to mind the sacred-bundle ceremonies of Pawnee and Arikara held in basically similar structures. In many ways these Plains Caddoans seem to have retained strong elements of the Middle Mississippi culture pattern. In Florida, the suggestive but as yet inconclusive evidences of association between man and various late surviving members of a now extinct fauna, like the much later evidences of the remarkable Key Marco culture, are always interesting. More important for the present work is the partial but orderly sequence of other cultures as indicated by the stratigraphic excavations of Willey, Woodbury, and Waring.

Consideration of the Lower Mississippi Valley and the Caddo sub-areas completes this survey of the eastern United States. These are both very important sequences, the former presenting an apparently complete sequence from Archaic to Temple Mound II and the Colonial period. In general, the authors follow Ford and Willey (*op. cit.*) in this sequence, but they place both Marksville and Troyville cultures in the Burial Mound II period, whereas Ford and Willey place Troyville in Temple Mound I, since the temple-mound-plaza arrangement first appears in this period. The Louisiana Mississippi sequence runs from the Copell culture in the Archaic, through Tchefuncte, Poverty Point, Marksville, Troyville, Coles Creek, Plaquemine, and Natchezan, the last two in the Temple Mound II period. The climax of the archaeological cultures of the region comes in Burial Mound II and Temple Mound I periods, including the Marksville, Troyville, and Coles Creek cultures. The Plaquemine and Natchezan cultures seem to represent a material degeneration. This is probably the combined result of intensive agriculture, over-population, and their not unusual concomitant, war. Archaeology has shown that this was a widespread phenomena in the greater part of the United States east of the Rocky Mountains at this time. It is significant that, from an ethno-geographic standpoint, Kroeber finds that the Natchez tribe marks the culture climax of the Southeast in early historic times. This is a good example of the shift of culture climaxes within a single culture area during a relatively short time period. Since much excavation data on the Caddo sub-area are not yet available, the present book presents a brief sketch of relatively late culture in the area between A.D. 1300–1700. As a link between Mexico, the lower Mississippi region, and the semi-sedentary cultures of the Great Plains, the importance of obtaining full data on Caddoan sequences and origins cannot be overemphasized.

Part VI, The Pacific Slope, brings together much material which has heretofore been badly scattered. California is here subdivided into three geographical areas from north to south and a brief, well-illustrated treatment is given of the early, transitional, and late cultures as now known for the Sacramento, San Francisco, San Joaquin, and Santa Barbara regions, as well as the coast and desert regions of southern California. Absence of pottery in all but Southern California makes the determination of archaeological sequences more difficult than in areas with ceramics, but it is obvious that great strides have been made within recent years. Promising linkages between southern California and the ceramic cultures of the Southwest have been established in the prehistoric Yuman or Patayan sequence. The present chronological sequence is based on two pivotal dates; the first, A.D. 1000 for the beginning of the Late period, is based on cross-finds of shell fish hooks in Pueblo ruins, and Hohokam sherds in sites near Los Angeles; and the second, a minimum date of 2000 B.C. for the Lake Mohave culture. The last, incidentally, is the earliest date given in Chart XV.

With these presumably ancient lithic cultures, discrepancies again occur, for the Borax Lake (with associated Folsomoid, Pinto Basin, and other later lithic types), as well as

the Pinto Basin and the Lake Mohave cultures have elsewhere been dated from the so-called Pluvial period, an estimated 10,000 years ago in this area. However, the present authors believe an assignment to a later wet period at *ca.* 1000 B.C. seems more reasonable. As Amsden, Howard, and others have shown, there is a close typological resemblance between the lithic artifact forms of the Lake Mohave, Pinto Basin, and Signal Butte I cultures. If all of these date somewhere around 2000 B.C., with the Plains Folsom culture slightly earlier, the suggested distribution of early cultures here and elsewhere makes sense. However if the Plains Folsom culture is demonstrably "nearer to 25,000 years old" as certain geologists and archaeologists have stated, then it does not, and the Lake Mohave, Pinto Basin, and Signal Butte I cultures must all be assigned much more antiquity on typological grounds.

In the Plateau and Northwest Coast sub-areas, the authors are hampered by the lack of stratigraphic excavations. However, they present good summaries of what is known and stress how little this is compared with what might be obtained by adequate and skillful digging. For the Plateau, a distinction is made between contact and pre-contact phenomena, and much of the material is, perforce, drawn from ethnographic sources. Of the four archaeological regions discussed, the Upper Columbia and Thompson River regions are said to fall together and contrast in various details with the cultures of the Middle Columbia and Snake Rivers. It is apparent that in early historic times the Plateau was subject to strong influences from both the Great Plains and the Pacific Coast. However, prior to this, Plateau culture appears to the authors to have been a local specialization of a basic cultural type extending from California to Alaska. The treatment of the Northwest Coast is similar, being mainly ethnographic, but evidences of antiquity, changes in physical type, and the direction and relative time of northern (Eskimo) and Plateau influences are noted. The interesting, but at present little understood, phenomena of the early occurrence of cairns, mounds, and associated copper artifacts on the southern Northwest Coast is not discussed (H. I. Smith, *Anthropological Papers, American Museum of Natural History*, 1907). The survey report of Drucker (*Bulletin 133, Bureau of American Ethnology*, 1943) still remains the best introduction to this fascinating and almost virgin archaeological field.

For the "Far North," the authors give a simplified and brief treatment of certain major early Eskimo cultures. An "original Eskimo culture," dating about 1000–100 B.C., is postulated, and from this arise, first the Okvik culture, and then, more or less simultaneously, two florescent cultures, the Old Bering Sea and the Ipiutak. Both of these incorporated strong Asiatic influences. From these two cultures arose the Birnirk and the Punuk, the former, possibly, being ancestral to the Thule culture which spread so far to the east. Southwestern Eskimo culture is believed to have been a southern offshoot of the "original Eskimo culture," giving rise to the Cook Inlet, Kodiak, and Aleutian archaeological sequences. The authors point out that in Ipiutak times this one village may have had a population larger than modern Fairbanks and that the southwestern Eskimo area was one of the most densely populated regions in aboriginal North America. To the east, the Cape Dorset culture is also regarded as another offshoot of the "original Eskimo culture," spreading to Greenland, Newfoundland, and even influencing northern New York, Wisconsin, and Minnesota. Perhaps, they say, this may have been due to the Thule culture peoples driving the Cape Dorset people to the south. In Greenland, only the Inugsuk culture is discussed. It is rather daringly suggested that the period when the Inugsuk peoples were absorbing elements of Norse culture was also the period when the Vikings from Greenland were exploring Hudson's Bay and the northern Great Lakes. At least one of the authors seems to have accepted the Kensington Stone and all its fascinating implications. Despite the fact that condensed cultural summaries are given in this section, as elsewhere, the Eskimo summaries and tables seem much more popular in their certainty of approach than is the case elsewhere in this richly factual book. It ties up a selected part of the vast and controversial literature on Eskimo archaeology in a neat package and presents it to the reader with only suave doubts. To the reviewer, this is a legitimate popular technique, but it seems alien to all but the first two sections of the present book. Thus, we come back to our starting point.

The conclusion to this extensive archaeological history of a great continent includes only three and one half pages. It is supplemented by an important time chart (Fig. 122), of four pages, which sets forth the very numerous cultures discussed, in relative and chronological time perspective. The conclusion is mainly an explanation of the time chart. It derives agriculture and maize cultivation from Mexico and pottery-making from two main directions, northeastern Asia and Middle America; a third form of pottery, Aleut, is believed, for no very cogently stated reasons, to be derived independently. The conclusion cites basic Asiatic origins and states logically, certainly in the light of the Eskimo record, that Asiatic influences to America continued to flow in "from time to time."

There is no summary regarding basic New World cultural origins. In this review we have reverted to this basic problem numerous times. The reasons for this are not pedantic. They are methodological and real. If, on the one hand, such older cultures as Copena (Folsomoid points reported), Lamoka, Indian Knoll, Signal Butte I, Borax Lake, Pinto Basin, and Lake Mohave range from A.D. 900 to only 2000 B.C., whereas Browns Valley, Yuma, Folsom, early Cochise and Sandia (which gets little attention here) skip a gap of 8,000 years (!), and all these are dated from 10,000–20,000 plus years, there would seem to be something fundamentally wrong in the relative dating of New World cultures. Eight thousand or more years in any other continent, where the early cultures are at all well known, covers a multitude of major cultures and epochs. The reviewer suspects that in the present case it merely covers a bad correlation between geological and archaeological guess dates. However, as has been previously stated, this debatable period of New World cultural origins concerns a very small percentage of North American aboriginal cultures and civilizations so well summarized, and temporally placed, in the book under review.

In 1919, W. H. Holmes wrote an "Introduction" to New

World archeology which, along with numerous other well-earned commendations, won the Loubat Prize. Unfortunately, Holmes never completed the second volume. In the opinion of the reviewer, the present book fills this lamentable intellectual gap. It is no discredit to the present authors to say that there is more to do. They have produced a good work under the sun. In the long story of man's slow rise toward intelligent behavior there will, we hope, always be another volume yet to be written.

WM. DUNCAN STRONG
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*The New World; the first pictures of America, made by John White and Jacques Le Moyne and engraved by Theodore De Bry, with the contemporary narratives of the Huguenot settlement in Florida, 1562–1565, and the Virginia colony 1585–1590.* STEFAN LORANT, ed. New York: Duell, Sloan and Pearce. 292 pp., figs. (incl. ports., facsims.) col. plates, maps, 31 cm., $20.00.

As the title suggests, the purpose of this work is to reproduce the extant first pictures of America that were painted by the French artist, LeMoyne, who visited Florida in 1564, and by the English water colorist, John White, who sketched at Roanoke in 1585. Le Moyne's works have all but vanished, but the British Museum has preserved a substantial number of White's drawings. However, in their day, the works of both artists were secured and engraved by Theodore De Bry of Frankfurt am Main and his sons, who altered the originals more or less to suit their tastes and in accord with the dominant artistic tradition of their time. The *New World* reproduces all of the De Bry engravings and such facsimiles and copies of the originals as were available or the editor chose to include. Supporting the pictures are the journals of Le Moyne and Le Challeux who accompanied the ill-fated Huguenot expedition to Florida, of which Francis Parkman wrote the classic account in *Pioneers of France in the New World;* the reports of Barlowe, Lane, Grenville, White, and Hariot on the Roanoke colony, 1585–90, are also reprinted.

The pictures are admittedly the best sources on the native life of the period, but they have not been related here to an extensive ethnological literature on Southeastern Indians. There is some excuse for overlooking periodical literature in which occur Maurice Mook's ethno-historical studies of Carolina Algonquians; but large libraries have Smithsonian publications by John R. Swanton, a name that occupies numerous Library of Congress subject and author cards; and the late David I. Bushnell, Jr. published a paper reproducing an original Le Moyne drawing of *Saturiova,* a Timucua chief, from his collection which is now at Harvard (*Smithsonian Miscellaneous Collections,* Vol. 81, No. 4, 1928). Nor does Lorant mention the colored photographic copies of the White originals which Praetorius made for the U. S. National Museum in 1889 for use in the Historical Exhibit at the World's Columbian Exposition in Chicago; Bushnell published photographs of 18 ethnological drawings, omitting the natural history subjects in the *Virginia Historical Magazine* (1927 and 1928); and prints from ten negatives were supplied to Lorant in 1945, after they were pointed out to him by one of his researchers.

Comparing the Praetorius copies, which are now somewhat faded, with recent photographs of the originals and with the British Museum *Pictorial Postcards* (coloured)—Set B 72, it is evident that the Ann Arbor facsimiles from the Clements Library, which were loaned to the project for reproduction, lack detail that is apparent in the other sets. The color process failed particularly in the group pictures of Indians, some of the plates being off register; but the natural history plates, on the other hand, are clear and crisp.

At least one scholarly reviewer has taken exception to modernizing the language of Elizabethan narrators (Samuel E. Morison in *The William & Mary Quarterly,* Jan., 1947, Vol. 4, No. 1, pp. 87–9).

The editor contributes historical notes on both colonies treated, provides notes on the artists, recounts the fates of their works, and he supplies an annotated bibliography and an index.

Students of the archaeology and ethnology of the Middle Atlantic and Southeastern states welcome the inclusion of all of this material within the covers of a handsome book. Meanwhile, they may look forward to a happier time when conditions allow the British Museum to fulfill its own plan of publishing the original White drawings.

In a review it is hardly appropriate to point out the ethnological significance of the several narratives because they are so well known and oft-quoted. Hariot's remarks on Indian agriculture merit re-reading. John White's observations on potsherds discovered on the island of Santa Cruz in June of 1587 remind us how old pot hunting is in the *New World:*

"We . . . while descending a hill discovered pottery fragments made out of the clay of that island; whereupon we judged that the island was inhabited . . . " (p. 156).

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*Preliminary Report on the Upper Mississippi Phase in Wisconsin.* W. C. MCKERN. Bulletin of the Public Museum of the City of Milwaukee, Vol. 16, No. 3, Milwaukee, 1945.

This long-awaited report by McKern on the Upper Mississippi manifestations in Wisconsin is based on the material from six major sites. Three foci are recognized in the report. The Orr Focus is determined largely on the data from the Shrake-Gillies and Midway sites. The Grand River Focus is based almost entirely on the Walker-Hooper site, while the McCauley site furnished most of the data for the Lake Winnebago Focus. The text presents additional evidence of unexcavated sites from which additional material has been derived; and this, taken together with data which have become available since McKern prepared his report, calls for a revision of the Wisconsin map of Oneota distribution to delineate more adequately boundaries and the distribution of this particular culture group.

It should be noted that this report, which has a publication date of 1945, was distributed in 1946, and the bulk of it was written in the period from 1931–33. The plates for this paper were prepared as early as 1933. There have been some minor changes and additions, but it stands as a report which was prepared some time ago. It is an excellent example of McKern's employment of what he calls the Midwestern Taxonomic Method at the more specific levels of that method, namely, the descriptions and analysis of foci within an aspect. While this study was not published until 1946, McKern made his results available to all of the students working on the northern Mississippi valley area from 1933 to 1946. The reader should keep in mind that occasionally where the term "Upper Mississippi" appears he should read "Oneota," for there is no attempt in this report to analyze and describe the cultural grouping of Oneota, Fort Ancient, and Iroquoian, which is now usually regarded as the Upper Mississippi group.

The paper was prepared, according to McKern, for the following reasons: "It is, therefore, the purpose of this study: (1) to place on record the facts supporting the Upper Mississippi cultural classification (Oneota); (2) to render available to middle North American archaeologists Wisconsin data which may prove of specific interest to students of more or less adjacent areas, due to the apparent similarity of the local cultural manifestations to more widely distributed variants; (3) to examine carefully those persistently recurring data indicative of a variant of the Upper Mississippi cultural manifestation for the pre-literate Winnebago Indians."

In the Introduction, there is a three-page summary of "Pre-literate Wisconsin Cultures" with a chart presenting a "Cultural Classification for Wisconsin." The six major Oneota sites are briefly described in regard to their location, and mention is made of additional sites and areas which have produced Oneota material. The cultural features are then described under such headings as bone implements, agriculture, cannibalism, and pottery. A tabular presentation of the cultural features is divided into the Orr, Grand River, and Lake Winnebago foci, the Rock River Focus, and the Upper Mississippi (Oneota) determinants. There is a chart of cultural similarity which numerically compares the traits held in common and differentiating the Upper Mississippi (Oneota) and Rock River divisions, as well as for the three Oneota foci in Wisconsin, and also for each pair of foci. The arrangement of the available cultural data by McKern is thus shown to require the recognition of differing degrees of cultural relationship between the various focal groupings of Oneota and indicates that, as a larger group called an aspect, this division is significantly homogeneous as compared to the Rock River Focus. The connection between Oneota and Rock River, as demonstrated by the material, caused McKern some concern for "Actually the similarity, as indicated by traits observed and recognized in Wisconsin manifestations, is represented in the preceding statistics as twenty-eight per cent. This figure might appear to warrant a correlation of the Rock River Focus and the Upper Mississippi (Oneota) foci in Wisconsin within the same phase. Such a correlation would place all of these groups within the Middle Mississippi Phase, since Barrett (1933) has logically demonstrated that the Rock River Focus is most conveniently classified as Middle Mississippi. However, there is patently a sufficiently strong cultural divergence between the two manifestations to justify classificatory separation; in fact, to demand separate classification, for the sake of convenience in handling cultural data, involving the purpose of classification. The similarities are sufficiently accounted for by correlation within the Mississippi Pattern."

A list of forty-two determinant traits is presented as the cultural characteristics shared by the various foci of Oneota. The determinants comprise from fifty-eight to sixty-nine per cent of the traits listed for the various foci groups. Within the foci the components are almost identical. The two eastern foci, Lake Winnebago and Grand River, are somewhat more closely connected, on the basis of total known traits, than either is to the Orr Focus. As McKern points out, this is probably due to the acidic soils of the Orr Focus sites in Wisconsin which have tended to decompose the calcareous, and perhaps other, artifacts, thus making the recorded close grouping of the two eastern foci more apparent than real. It might be observed that the Grand River Focus is the most divergent from the standpoint of ceramics alone.

A brief summary presents the classificatory alignment as the Orr, Grand River, and Lake Winnebago foci of the Oneota Aspect, Upper Mississippi Phase, Mississippi Pattern.

The next division of the report presents the available evidence in Wisconsin for the age of this cultural division as determined by stratigraphy from the White Camp Site II in Vernon County and the Midway village site in La Crosse County. At both of these sites Oneota appeared as the last aboriginal occupation and in each case overlay Woodland material. At the White Camp site there also was found "Basic Hopewell" according to Figure 14, but perhaps better identified as Trempealeau Focus as is done in the text, which extends to the same depth as the Woodland material but does not apparently last as long. The identification of these two earlier cultural divisions in this report is done entirely on pottery. In this regard the following two sentences might be quoted. "Since decorated sherds were of rare occurrence in this deposit, and since the only sherds classified as of the Trempealeau Focus were those bearing rouletted or stamped patterns, aside from one sherd showing the typical cross-hatched rim of the finer ware, it is quite possible that many sherds classified as Woodland were in fact Trempealeau Focus products. With this in mind, and in consideration of the fact that sherds classified as Trempealeau increased in number as the bottom of the deposit was approached, the base stratum of the deposit may have represented pure Trempealeau Focus products rather than mixed Trempealeau and Woodland products." The segregation into two cultural units, with the names Trempealeau and Woodland, and placement in two different taxonomic niches made it very difficult for the author to accept the idea that two such products could have been made by a single group at a given time period.

Another major but relatively small section presents cultural comparisons with the eastern Plains, Fisher Focus in

Illinois, Fort Ancient, and Iroquois. McKern was apparently the first to recognize the Oneota material in the eastern Plains and to discuss its significance. The other cultural divisions in that area called Nebraska, Upper Republican, and Lower Loup, which McKern suggests are variants of Upper Mississippi, are perhaps better regarded as representing significant units of their own which can be understood in terms of their own cultural history rather than as divisions of a taxonomic phase. The suggestion of a significant connection between the Fisher Focus in Illinois and Grand River is a valuable one which some enterprising student might tackle. As McKern expressly states, the existence of a taxonomic unit called Upper Mississippi and comprised of Oneota, Fort Ancient, and Iroquois, has been assumed but never demonstrated. In fact, the current taxonomic arrangement of Iroquois has been done by rule of thumb and not by the presentation of data. The reviewer has serious doubts that anything very much will be gained by any attempt to demonstrate such a division as the assumed Upper Mississippi in view of the apparent divergent cultural histories of the Oneota, Fort Ancient, and Iroquois groups. One statement of McKern's is particularly significant with regard to Iroquois origins and calls for further investigation. "Of the various specific types of pottery ascribed to the Iroquois, one, apparently archaic type, characteristic of old sites from New York to Ontario, and actually encountered as far west as Isle Royal, Michigan, is represented by vessels with rounded bases, flaring rims, occasionally notched lips, occasional loop handles, and incised ornamentation above the shoulders. These selected traits do not adequately describe this pottery, but they are of common occurrence and, added to the available list of other culture-indicative products in stone, bone, and antler, strongly demonstrate the cultural similarity between old Iroquois and Upper Mississippi cultural manifestations." Does this imply that such a genetic connection, if demonstrated, would lend support to the suggested classification? The reviewer is unfortunately unfamiliar with this "archaic" Iroquois material and the reference in the report is not bolstered with footnotes.

In the conclusions there is a general cultural summary of the significant cultural features of Oneota in Wisconsin, a brief statement contrasting Oneota with other local culture groups, a comment on the southeastern origin of Oneota, and a statement as to the tribal affiliations. The conclusions end with McKern's views of intra-regional problems.

This publication is one of solid worth presenting the primary data on an important late aboriginal culture in Wisconsin. The full descriptive section of the artifacts is buttressed by ample and excellent photographs. The information with regard to the chronological placement is not slighted and the ethnological affiliations are clearly indicated. The cultural origins are stated to lie with groups of the Mississippi Pattern in the Southeast. The main emphasis in the report is on the presentation of the Oneota complex in terms of a taxonomic grouping. More emphasis might have been placed on this complex in terms of its historic development although this would have been a most difficult, if not almost impossible task, at the time the report was written. It is unfortunate indeed that, because of factors beyond the control of the author, this report, which was designed to be the first to emphasize the taxonomic approach, may well be one of the last to have this as one of the primary problems.

James B. Griffin
University Museums
Ann Arbor, Michigan

# NOTES AND NEWS

## ARCHAEOLOGICAL SITES IN THE MIDDLE RIO BALSAS BASIN

Through a regrettable series of errors, a map of sites was omitted from the article "Archaeology of the Middle Río Balsas Basin, Mexico" by Robert H. Lister which appeared in the last issue of AMERICAN ANTIQUITY (Vol. XIII, No. 1, pp. 67–78). This map is reproduced here as Figure 42. The numbers on the map refer to the following sites: (1) San Jeronimo, (2) Santiago, (3) Mexiquito, (4) Catatemba, (5) Zirándaro, (6) Embarcadero, (7) Characuaro, (8) Turicio, (9) Urapa, (10) Huetamo, (11) Cutzeo, (12) La Florida, (13) Purechucho, (14) Los Cuachalates, (15) Pandacuareo, (16) Los Placeres del Oro, (17) San Lucas, (18) Chumbitaro, (19) La Huisachal, (20) Pungarabato, (21) Urerio, (22) Jario, (23) Cutzamala, (24) El Respaldo, (25) Amuco, (26) Tlapehuala, (27) El Limon, (28) Santa Rosa, (29) Ajuchitlan, (30) Cerro de Aguila, (31) San Miguel Totolapan, (32) Perdon, (33) Cerro Aviloz, (34) Corral de Piedras, (35) El Cubo Viejo, (36) Citahua, (37) El Valle, (38) Amacuahuitl, (39) Cuadrilla de Santo Tomas, (40) El Tamarindo, (41) between Tetela del Río and Pezuapan, (42) Tetla del Río, (43) Oztotitlan.

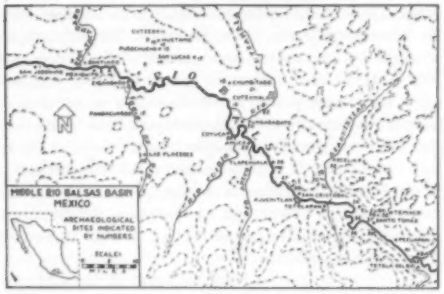


FIG. 42.

## APPOINTMENTS BY THE PRESIDENT

In accord with Articles II and VI of the By-Laws and with the approval of the Executive Committee, President Johnson has made the following appointments:

*Nominating Committee:* Emil W. Haury, Chairman; W. Duncan Strong; Alex D. Krieger.

*Representative to the Inter-American Society for Anthropology and Geography:* Frank H. H. Roberts, Jr.

*Delegate to the National Council of Historic Sites and Buildings:* J. O. Brew.

*The Viking Fund Award Committee:* Frederick Johnson, Chairman; Henry B. Collins; Gordon F. Ekholm; Emil W. Haury; Robert F. Heizer; Irving Rouse; W. Duncan Strong.

*Auditing Committee:* Paul Weer, Chairman; Georg Neumann; W. J. Wallace.

## NOMINATIONS FOR NEW OFFICERS

Members are invited to make suggestions regarding the names of persons to fill the positions of President, First and Second Vice-Presidents, Secretary, and two members of the Executive Committee. These should reach the Nominating Committee before April 1, 1948.

Members' attention is called to the provision that any five persons may nominate an additional candidate for any vacant office, provided that such nomination is submitted to the Nominating Committee at least thirty days before the Annual Meeting. (See below, p. 199.)

## EDITORIAL COUNCIL

An Editorial Council, consisting of the editors of the various anthropological journals, has been formed under the auspices of the American Anthropological Association. The members of this Council, together with the names of their journals and the year in which each was founded, are as follows:

J. Alden Mason (*American Anthropologist*, 1888).
Wayland Hand (*Journal of American Folklore*, 1888).
C. F. Voegelin (*International Journal of American Linguistics*, 1917).
T. Dale Stewart (*American Journal of Physical Anthropology*, 1918).
John M. Cooper (*Primitive Man*, 1928).
Irving Rouse (AMERICAN ANTIQUITY, 1935).
Conrad Arensberg (*Applied Anthropology*, 1941).
Ralph Beals (*Acta Americana*, 1943).
Leslie Spier (*Southwestern Journal of Anthropology*, 1945).

The general purpose of the Editorial Council is to provide opportunity for consultation regarding papers and problems common to the publication of journals having national or international scope in anthropology. It is hoped that AMERICAN ANTIQUITY will benefit from the participation of its editor in the Council.

## MEETINGS

The Annual Meeting will be held at the Milwaukee Public Museum on May 14 and 15, 1948. James B. Griffin has been appointed chairman of the program committee and W. C. McKern, chairman of the committee on local arrangements.

A Special Meeting is called for the purpose of reading archaeological papers. This will be held in conjunction with the meetings of the American Anthropological Association from December 27 to 29, 1947 in Albuquerque, New Mexico. Dr. Emil W. Haury will be in charge of the Society's program. Other members of the program committee are Paul Reiter and Malcom Farmer.

# ANNUAL MEETING OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY, 1947

The twelfth annual meeting of the Society for American Archaeology was held on Friday and Saturday, May 16 and 17, 1947, at the University of Michigan, Ann Arbor, Michigan. The meeting took place in conjunction with that of the Central States Branch of the American Anthropological Association.

## MEETING OF THE COUNCIL

A meeting of the Council was held at 11:30 A.M. on Friday. The Council unanimously voted approval of the revised Constitution of the Society for American Archaeology, after raising the amount of the annual dues, as provided therein, from $5.00 to $6.00. The Council then voted unanimously to approve the budget, incorporating the raise in dues. Approval was voted for the official sponsorship by the Society of Dr. Frederica de Laguna's proposed field work in Japan. The Council meeting adjourned at 12:30 A.M.

## ANNUAL BUSINESS MEETING

The annual business meeting of the Society was called to order by President Byers at 4:45 P.M. on Friday, with approximately 30 members present. The President opened the meeting with a report on the status of the Society, as follows:

### A REPORT FROM THE PRESIDENT

In the course of the year, the President is regularly expected to appoint certain committees to perform the functions necessary to keep the Society running. In addition to the usual committees, a special committee was appointed last summer to examine the advisability of revising the Constitution because it had become evident, in the four years since it was adopted, that there were certain ambiguities and conflicts, particularly in regard to the duties and powers of the Executive Committee, the Council, and certain officers. This Committee prepared a revised draft of the Constitution which clarifies these duties and codifies certain practices now in force, at the same time adding a few new features which the Committee felt were desirable. This draft, which was mailed to you thirty days before the meeting, as required by the Constitution, has already been approved by the Council and may therefore be adopted by a vote of the majority present at this meeting.

It is of some interest to review the growth of the Society during the years since the war. On April 30, 1945, we had a total of 764 members. A year later we numbered 824. Today our membership has reached 927, This increase is in part due to a drive for new members among graduate and undergraduate students of anthropology at our universities and colleges. Invitations were sent out to 235 students, regardless of their fields of interest. In addition, a number of new members were recruited at the University of New Mexico through the work of Garland J. Marrs, and at the University of California through the work of Robert F. Heizer. As a result, applications for 65 new memberships were received.

Our membership includes a very large proportion of non-professionals. In fact, the non-professional members are more numerous than the professional members of the society. It is also of considerable significance that these are the people who supply a very large part of the enthusiasm and support which keep the Society going. Without their contributions it would not have been possible to pursue the publication program which the Society has followed.

The Society has very definitely come of age, and it is time that it lived up to its obligations as set forth in Article II of the Constitution. Some will argue that, if we are to promote and stimulate interest and research in the field of American Archaeology and attempt to do all the other things listed among the purposes of the Society, we shall have to assume responsibility, and that it is bad policy to assume responsibility. With this argument I have little patience. We cannot avoid responsibility and still discharge our duties to our membership and our science. In order to promote and encourage publication of results of research we publish AMERICAN ANTIQUITY, and we have so far issued three MEMOIRS. The Council has today taken a very important step forward in voting to sponsor Dr. Frederica de Laguna in her plans to undertake research on the archaeology of the Ainu of Japan, which is designed to uncover further evidence bearing on the interchange of cultural influences between Asia and the New World, an hypothesis which she has formulated in her "Prehistory of Northern North America as Seen from the Yukon." Steps to formulate problems and to correlate attacks on them by different workers and institutions certainly lie within the sphere of our activities.

The Society for American Archaeology is not a cell, separate and distinct from the rest of the world. We are a part of that social organization which we call the United States. As such we are affected by all influences which affect the nation. Changes in thinking, changes in economic status, changes in philosophy, all affect our activities. We can no more escape the present rise in everything except the salaries of persons working for institutions than we can escape the impact of war. It costs more to publish than it did a year ago, and it cost more then than it did four years ago.

Our members are once again undertaking research and are writing reports of their work. Our Editor, Dr. Rouse, will tell you in his report that during the past winter manuscripts have flowed in at a very rapid rate. Whereas a year ago we were bothered by a shortage of manuscripts, the Editor now has a backlog sufficient to maintain AMERICAN ANTIQUITY at its present size for a year. We have a responsibility to our members to publish their papers fairly promptly. If we allow manuscripts to pile up as they did five years ago, when a manuscript waited for as much as eighteen months before publication, we shall hinder the publication of timely articles, and AMERICAN ANTIQUITY will again find that authors will not submit their papers. It is essential that we supply the Editor with sufficient funds to meet the present higher costs and even to enlarge the size of the journal to the point where it will accommodate papers which are submitted.

To maintain AMERICAN ANTIQUITY at its present size it will require an increase in dues to $5.00. When the Council considered the revised draft of the Constitution, it had in mind the fact that this would not prevent the piling up of a backlog of manuscripts. It therefore felt that dues should be raised to $6.00, a figure which will make it possible to include a larger number of papers and to publish manuscripts more promptly. If costs should go up again, it will then be necessary to reduce the size of the issues accordingly.

Respectfully submitted,
DOUGLAS S. BYERS, *President*

The minutes of the tenth annual meeting were not read but were approved as published in AMERICAN ANTIQUITY, Vol. XII, No. 2 (October, 1946).

The report of the Secretary was read and accepted.

### REPORT OF THE SECRETARY

The eleventh annual meeting of the Society for American Archaeology was held at the Lincoln Hotel in Indianapolis, Indiana, on May 17 and 18, 1946, jointly with that of the Central States Branch of the American Anthropological Association. The minutes of the meeting were published in AMERICAN ANTIQUITY, Vol. XII, No. 2 (October, 1946).

During the past year, 1946–47, President Douglas S. Byers made the following committee appointments:

*Budget Committee:* Frederick Johnson, Chairman; and the Executive Committee.

*Auditing Committee:* Maurice Robbins, Chairman; Ripley B. Bullen; Benjamin L. Smith.

*Nominating Committee:* J. O. Brew, Chairman; Henry B. Collins; James B. Griffin.

*Program Committee:* Fay-Cooper Cole, Chairman; Glenn A. Black; John C. MacGregor; George I. Quimby, Jr.

*Committee on Local Arrangements:* Volney H. Jones, Chairman; Emerson F. Greenman.

*Membership Committee:* Robert F. Heizer, Chairman; T. M. N. Lewis; Maurice Robbins; P. F. Titterington; E. B. Sayles.

*Resolutions Committee:* Carl E. Guthe, Chairman; W. S. Webb; G. R. Willey.

*Planning Committee:* Frederick Johnson, Chairman; E. W. Haury; J. B. Griffin.

*Committee to Consider Revision of the Constitution:* Watson Smith; Frederick Johnson.

In June, 1946, the Council accepted an invitation extended by Volney H. Jones and Leslie A. White, on behalf of the Department of Anthropology and the Museum of Anthropology, University of Michigan, to hold the next annual meeting of the Society in Ann Arbor. The time for this meeting, again a joint one with the Central States Branch, American Anthropological Association, was set for the weekend of May 16 and 17 by Council action in November.

Also in June, the Executive Committee unanimously approved a special meeting of the Society in conjunction with the Chicago meetings of the American Anthropological Association and other groups at Christmas time. Mr. G. I. Quimby, Jr. was appointed to represent the Society on the committee in charge of local arrangements for these sessions.

In July, the president appointed a committee to consider possible recipients of the Viking Fund Medal and Viking Fund Prize for significant contributions in Archaeology. Dr. A. V. Kidder was selected to receive the award for 1947. Members of the Award Committee, besides Mr. Byers acting as chairman, were: H. B. Collins, Jr., G. F. Ekholm, J. B Griffin, E. W. Haury, H. O. Hencken, F. Johnson, T. D. McCown, G. R. Willey.

In March, 1947, a meeting was held in Washington, D. C., to form a National Council for the Preservation of Historic Sites, Buildings, and Monuments. A number of organizations were interested in the objectives of the proposed new body, and the Society for American Archaeology was asked to participate. Dr. J. O. Brew was appointed official delegate of the Society for the purpose of this meeting.

In contrast to the war years, it is gratifying to note the increasing number and breadth of activities in which the Society is participating. This may be taken as growing evidence that the group is serving a useful purpose for its members and for others.

Respectfully submitted,
WALDO R. WEDEL, *Secretary*

The report of the Editor was read and accepted, after some discussion as to the advisability of raising the dues to meet increased publication costs and to permit expansion in the size of AMERICAN ANTIQUITY.

## REPORT OF THE EDITOR

During the year 1946–47 the Society published Vol. XII of AMERICAN ANTIQUITY, amounting to 304 pages, and MEMOIR No. 3, containing 360 pages. The retiring Editor, Douglas S. Byers, was responsible for most of this heavy schedule, the present Editor handling only Nos. 3 and 4 of the current volume of AMERICAN ANTIQUITY.

In terms of the amount of material published, Vol. XII is the largest yet issued. In part, this is due to the inexperience of the new Editor, who underestimated the length of one issue, and in part it has been made possible by generous contributions from authors and from a friend of the Society. As the retiring Editor noted last year, contributions have also made possible the publication of MEMOIR No. 3.

The issues of AMERICAN ANTIQUITY published during the year have not been restricted to any particular region or subject. However, so much material has come in recently on Mexico, that we plan to devote the entire first issue of Vol. XIII, i.e., the July number, to that country, continuing the practice of special issues begun by the previous Editor.

Soon after the new Editor took over, he was informed by our printers that it would be necessary to increase their charges 30 per cent. Fortunately, it proved possible to delay this increase until the final number of the year, and to absorb the additional cost of that issue. During the coming year, however, some other way must be found to meet this situation.

The most obvious way would be to find a cheaper printer. With this in mind, we asked six companies to quote us prices on publishing AMERICAN ANTIQUITY. Four of them refused even to consider taking on new work at this time, a fifth would do so only if we agreed to change our format, while the sixth quoted us a price considerably higher than that of our present printers. A change at this time, therefore, does not seem advisable.

The other alternatives are either to reduce the size of the journal by 30 per cent or to increase the amount allocated for publication by the same percentage. Neither of these alternatives is a happy one. If we reduce the size of the journal, it will be necessary for the Editor to reject manuscripts which are worth publishing. If on the other hand, the size of the journal is to remain the same, there must be an increase in dues.

When the editorship changed hands in September, there were barely enough manuscripts on hand to fill the next issue of AMERICAN ANTIQUITY. Since then, contributions have been received at twice the rate of publication. Theoretically, the Editor should now be rejecting one manuscript of every two submitted; if the journal is reduced in size, it will be possible to publish only one manuscript in every three.

Three steps have been taken during the past year to meet this problem: (1) restriction of the scope of the articles accepted for publication, (2) limitation of the length of contributions, and (3) raising of the standards of quality required for acceptance. Unfortunately, because we were not at first aware of the gravity of the problem, we did not apply these restrictions evenly throughout the year, but we hope hereafter to keep them on an even level.

So far as the scope of contributions is concerned, we have followed the practice of accepting only material dealing with the archaeology of the New World or directly pertinent to it. Other contributions have been rejected or, if they seemed particularly worth publishing, have been referred to other journals. For example, we have transferred an article on the ethnohistory of Puerto Rico to *Acta Americana* and another on the archaeology of Guam to the *American Anthropologist*, in the latter case reversing a precedent set when more space was available.

In respect to length, we have arbitrarily set limits of sixteen printed pages for main articles and four printed pages for other material unless the authors were willing to pay the difference. These restrictions supplement the limits placed upon the number of illustrations by the previous Editor, which still remain in force.

When rejecting manuscripts on the basis of quality, we have followed the practice, whenever possible, of suggesting improvements and, in fact, have accepted a number of contributions resubmitted after revision. In these cases we have relied heavily on the judgment of the Associate and Assistant Editors.

Since last summer, a total of 62 manuscripts have been submitted for publication either as main articles or in the section "Facts and Comments." Of these, we accepted 36 upon receipt and 8 after revision by the authors; transferred 6 to other publications; and rejected 12, several of which may eventually be accepted after revision. In other words, only 58 per cent of the principal contributions have been accepted upon submission and another 13 per cent after revision.

Despite these measures, the backlog of manuscripts accepted for publication has grown until we now have from twelve to fifteen months' supply on hand, depending on the size of future issues. If we publish at the rate of the past year, the present supply of manuscripts will not be used up until next April, while if, as has been suggested, the size of the journal is reduced, publication of the articles most recently accepted will be delayed until July, 1948.

While the number of contributions for AMERICAN ANTIQUITY has been increasing, the number of manuscripts submitted for publication as MEMOIRS has declined. Only one possible MEMOIR was received during the past year and it was later withdrawn when a local medium of publication became available.

As a result, the Editor recommends that the money hitherto allocated in the budget for publication of MEMOIRS be used during the coming year to increase the size of AMERICAN ANTIQUITY. If combined with an increase in dues, this will make it possible to enlarge the average issue from the present 72 pages to 80 pages, and will reduce the backlog of manuscripts to a nine-months' supply, which seems a reasonable amount.

With the advent of a new Editor, a number of changes have been made in the staff of Associate and Assistant Editors. James B. Griffin has accepted appointment as Associate Editor, and Frederica de Laguna, Robert F. Heizer, Richard G. Morgan, and William S. Haag, as Assistant Editors. The Editor wishes to express his appreciation to these people and to the other Assistant Editors, who have remained in office, for their cooperation, and he is particularly grateful to the retiring editor, Douglas S. Byers, for his advice and assistance.

Respectfully submitted,
IRVING ROUSE, *Editor*

On behalf of the Budget Committee, Mr. Johnson presented the budget of receipts and expenditures for the year 1947–48, as amended by the Council to allow for an increase in the dues to $6.00 per year. This budget was accepted by a voice vote.

BUDGET 1947–48

*Estimate of Income*

| | | |
|---|---|---|
| Estimated Beginning Balance Forward | | |
| Balance Forward, Working Fund | $1,685.60 | |
| Balance Forward, Planning Committee | 972.19 | |
| | $2,657.79 | |
| Estimated Income from Dues and Subscriptions | | |
| Prepaid Dues Brought Forward | | |
| 21 Members at $4.00 | $ 84.00 | |
| Additional Dues from Prepaid Members | | |
| 21 at $2.00 | 42.00 | |
| 52 ½-Year Payments at $2.00 | 104.00 | |
| Additional Dues from ½-Year Payments | | |
| 52 at $1.00 | 52.00 | |
| Total Prepaid Dues | $ 282.00 | |
| 1946 Dues: 629 Members at $6.00 | 3,774.00 | |
| 150 Subscriptions to AMERICAN ANTIQUITY at $6.00 | 900.00 | |
| | | 4,956.00 |
| Contributions | | 200.00 |
| Sale of AMERICAN ANTIQUITY | | 200.00 |
| Transferred from Publication Fund Account MEMOIR No. 4. | | 600.00 |
| Transfer from Publication Fund Account Publishing AMERICAN ANTIQUITY | | 306.40 |
| Total Estimated Income | | $8,920.19 |

*Estimate of Expenses*

| | | |
|---|---|---|
| Publishing AMERICAN ANTIQUITY | | |
| Volume XII, No. 4—net cost | $1,000.00 | |
| Volume XIII, Nos. 1–4 | 4,800.00 | |
| | | $5,800.00 |
| Publishing MEMOIR No. 4 | | 600.00 |
| Editor's Account | | |
| Editorial Assistant (50.00 per Quarter) | $ 200.00 | |
| Secretarial Assistant (25.00 per Month) | 300.00 | |
| Art Work (12.50 per Quarter) | 50.00 | |
| Postage, Telephone, Supplies | 50.00 | |
| | | 600.00 |
| Treasurer's Account | | |
| Secretary | $ 220.00 | |
| Printing and Mimeographing | 60.00 | |
| Bank and Collection Charges | 20.00 | |
| Postage, Telephone, Supplies | 50.00 | |
| Moving Treasurer's Office | 50.00 | |
| | | 400.00 |
| Miscellaneous Expenses | | |
| Secretary's Office | $ 60.00 | |
| President's Office | 15.00 | |
| Incidentals | 50.00 | |
| Annual Meeting | 150.00 | |
| | | 275.00 |
| Planning Committee Expenses | | 972.19 |
| Transfer to Publication Fund Account Memoir No. 5 | | 273.00 |
| Total Estimated Expense | | $8,920.19 |

The reports of the Treasurer and of the Auditing Committee were read and accepted.

## REPORT OF THE TREASURER

### ACCOUNT OF MEMBERSHIP

During the fiscal year 1946–47, the total membership increased from 811 to 927. The changes were as follows:

| | *Active* | *Institutional* | *Life* | *Benefactor and Honorary* |
|---|---|---|---|---|
| 5/1/46 | 660 | 151 | 12 | 0 |
| New and Reinstated | 138 | 29 | 1 | |
| Dropped | 61 | 3 | | |
| Deceased | 0 | | | |
| 4/30/47 | 737 | 177 | 13 | 0 |

The types of accounts represented among the membership are as follows:

| | *Active* | *Institutional* |
|---|---|---|
| Fiscal | 703 | 86 |
| Fiscal Prepaid | 34 | 11 |
| Calendar Year | 0 | 80 |
| Exchange and Complimentary | | 11 |

### BALANCE SHEET[1]

*Resources*

| | | | |
|---|---|---|---|
| Cash in Checking Account, General Operating Balance | | $2,127.40 | |
| Publication Fund, Savings Account | | 1,742.39 | |
| Dues Receivable | $ 19.00 | | |
| Miscellaneous Accounts Receivable | | | |
| Sale AMERICAN ANTIQUITY and MEMOIRS | $ 29.20 | | |
| Reprints and Illustrations | 142.35 | | |
| | 171.55 | | |
| | | 190.55 | |
| Total General Operating Assets | | | $ 4,060.34 |
| Cash in Checking Account, Planning Committee | | | 972.19 |
| Permanent Fund (Life Membership), Savings Account | | | 851.80 |
| | | | $ 5,884.33 |

*Liabilities and Capital*

| | | | |
|---|---|---|---|
| Dues Prepaid | | $ 380.50 | |
| Estimated Bills Payable | | 1,100.00[2] | |
| Total Liabilities | | | $ 1,480.50 |
| Restricted Capital | | | |
| Planning Committee | $972.19 | | |
| Permanent Fund | 851.80 | | |
| | | $1,823.99 | |
| Free Capital | | 2,579.84 | |
| Total Capital | | | 4,403.83 |
| | | | $ 5,884.33 |

[1] As of May 1st, 1947.

[2] Estimated cost of publishing

| | |
|---|---|
| AMERICAN ANTIQUITY, Vol. XII, No. 4 | $1,000.00 |
| Estimated Expense Annual Meeting | 100.00 |
| | $1,100.00 |

WORKING FUND

*Receipts*

| | | |
|---|---|---|
| Beginning Balance Forward 5/1/46 | | $ 2,576.30 |
| Dues and Subscriptions | | |
| Prior Years | $ 30.00 | |
| 1946–47 | 3,332.00 | |
| Prepaid | 380.50 | |
| | $3,742.50 | |
| Contributions | 704.24 | |
| Sale AMERICAN ANTIQUITY | 459.97 | |
| Reimbursement for Reprints | 341.40 | |
| Reimbursement for Illustrations | 68.03 | |
| Sundry | | |
| Received for Collection Charges and Exchange | $ 1.50 | |
| Received for Foreign Postage | 2.10 | |
| Reimbursement for Corrections on Galley | 119.33 | |
| Annual Meeting 1946 | 23.62 | |
| Sale of Strip List | 2.89 | |
| Received for Transfer to Life Membership | 75.00 | |
| Account MEMOIR No. 3 Grant University of Pennsylvania Museum | 500.00 | |
| Transferred from Publication Fund | 3,552.02 | |
| Transferred from Publication Fund over Deposit of Contributor | 300.00 | |
| | 4,576.46 | |
| Total Cash Received | | $ 9,892.60 |
| Total | | $12,468.90 |

*Expenditures*

| | | |
|---|---|---|
| Publishing AMERICAN ANTIQUITY | | |
| Printing | $2,296.07 | |
| Illustrations | 522.05 | |
| Distribution | 97.14 | |
| Reprints | 375.17 | |
| | $3,290.43 | |
| Editor's Account | 243.39 | |
| Treasurer's Account | 214.58 | |
| Sundry | | |
| Annual Meeting 1946 | $ 56.48 | |
| Transfer to Publication Fund (Contributions Received) | 1,804.24 | |
| Transfer to Permanent Fund | 75.00 | |
| Refunds and Adjustments of Accounts | 21.11 | |
| Printing | 59.00 | |
| Strip Lists | 5.16 | |
| Collection Charges | 0.19 | |
| President's Stationery | 12.50 | |
| Checks Uncollectable | 20.00 | |
| Annual Meeting 1947 | 15.21 | |
| | 2,068.89 | |
| Printing MEMOIR 3 | 3,552.02 | |
| Total Cash Paid | | $ 9,369.31 |
| Total Cash on Hand 4/30/47 | | |
| Planning Committee Balance | $ 972.19 | |
| General Operating Balance | 2,127.40 | |
| | | $ 3,099.59 |

PERMANENT FUND

| | | |
|---|---|---|
| Brought Forward 4/30/46 | | $ 761.49 |
| Interest 10/15/46 and 4/15/47 | | 15.31 |
| Mr. Edward Milligan—Life Membership 3/12/47 | | 75.00 |
| Balance 4/30/46 | | $ 851.80 |

PUBLICATION FUND

| | | |
|---|---|---|
| Brought Forward 4/30/46 | | $ 3,714.44 |
| Interest 10/15/46 and 4/15/47 | | 75.73 |
| Contributions Transferred from Operating Fund | | |
| 10/18/46 Miscellaneous | $ 185.24 | |
| 3/12/47 Miscellaneous | 19.00 | |
| 3/12/47 de Laguna Account MEMOIR No. 3. | 200.00 | |
| 3/12/47 Miscellaneous | 100.00 | |
| 4/28/47 Transferred Account MEMOIR No. 3 | 700.00 | |
| Miscellaneous | 100.00 | |
| Appropriation | 500.00 | |
| | 1,804.24 | |
| Total Cash Deposited | | $ 5,594.41 |
| Transfers to Working Fund | | |
| 4/28/47 Account MEMOIR No. 3 to Pay Printing Costs | 3,552.02 | |
| 4/29/47 Adjustment of Duplicate Deposit | 300.00 | |
| Total Cash Withdrawn | | 3,852.02 |
| Balance 4/30/47 | | $ 1,742.3 |

Respectfully submitted,
FREDERICK JOHNSON, *Treasurer*

## REPORT OF THE AUDITING COMMITTEE

The undersigned, appointed as the Auditing Committee, report that they have examined the Treasurer's accounts, as submitted for the fiscal year 1946, and find them correct.

BENJAMIN L. SMITH
RIPLEY P. BULLEN

The report of the Membership Committee was read by Dr. P. F. Titterington and accepted as read.

## REPORT OF THE COMMITTEE ON MEMBERSHIP

The present report is submitted by the Membership Committee appointed by the President and consists of the writer as chairman, P. F. Titterington, M. J. Robbins, and T. M. N. Lewis. Work of the present committee was much simplified since the preliminary considerations had been worked out by the previous committee under the chairmanship of the present editor, Irving Rouse. The present report assumes familiarity with the earlier report printed in AMERICAN ANTIQUITY, Vol. XII, No. 2, p. 138, 1946.

The committee is unanimous in recommending that the provision in the Constitution of the Society which requires that each applicant for membership be recommended by a person already a member be revised, on the grounds that the present provision is restrictive, and that its elimination will encourage expansion. A specific provision in the Constitution, stating that unethical conduct will result in loss of membership, will satisfactorily substitute for the old provision that new members must be recommended by a person already a member.

A sample invitation form has been prepared, and it is recommended that this, together with an application blank, be sent to prospective members. Local archaeological societies offer the largest field for expansion, and it is suggested that distribution of applications for membership in the national society can be made through officers of local societies or persons who are members of both the local and national society. Another potential source of members comprises advanced university students whose major subject is anthropology. Distribution of applications for membership can be made in this case by members of departmental staffs.

Finally, application forms can be distributed to persons who are already members and who would be willing to make an effort to secure new memberships in their own locality. Notification of a membership drive can be made in an editorial in AMERICAN ANTIQUITY, and distribution of invitations to join can be made by the Editor and President.

No recommendations are made here concerning a change in format of AMERICAN ANTIQUITY, simplification of language in articles, or joint-suscription memberships (i.e., a single dues payment for membership in a local and national society)—these possibilities have been explored and are not considered feasible.

The Treasurer, F. Johnson, has raised the question of the advisability of revising the qualifications for Life Membership. According to him, the Society loses money at the present fee of $75. The Committee on Membership feels that Johnson's suggestion of a $250 fee is too high and recommends that the fee be raised to a minimum of $100 and maximum of $150. Further action on this matter will have to be taken up by the President's committee to revise the constitution.

Respectfully submitted,
ROBERT F. HEIZER, *Chairman*

J. O. Brew presented a report on the activities of the Committee for Recovery of Archaeological Remains. He also reported as the Society's representative to the Council for the Preservation of Historic Sites, Buildings, and Monuments. Both reports were approved.

On behalf of the Committee to Consider Revision of the Constitution, Mr. Johnson presented the revised Constitution of the Society, incorporating the change in dues from $5.00 to $6.00 previously voted by the Council. The new Constitution was accepted without dissent. (For the revised Constitution, see pp. 198–200 of this issue.)

An invitation to the Society to hold its next annual meeting at Bloomington, Indiana, was extended by Georg Neumann on behalf of the Department of Anthropology at the University of Indiana. On behalf of the Milwaukee Public Museum and the Museum Association of Milwaukee, W. C. McKern invited the Society to hold the meeting in Milwaukee, Wisconsin. The decision as to the place of the meeting was left to the Executive Committee.

James B. Griffin moved that the incoming President take under advisement a suggestion by Alex D. Krieger that the Society survey ways and means of synthesizing the results of archaeological research in the Americas. This motion was seconded and approved.

The following resolutions were presented by the Committee on Resolutions (Guthe, Chairman; Webb; and Willey) and were unanimously adopted:

*Be it resolved*, That the Society for American Archaeology record its grateful appreciation of the hospitality extended to it by the University of Michigan and express its gratitude to Volney H. Jones and E. F. Greenman, who, as the Committee on Local Arrangements, made possible the successful conduct of this annual meeting.

*Be it resolved*, That the Society for American Archaeology record its deep gratitude and appreciation to Frederick Johnson, the retiring treasurer, for the services he has rendered the organization during the past five years. He directed with distinction the financial destinies of the Society through the war years and the economic uncertainties which followed. He gave a large proportion of his time and energy unstintingly to the improvement of the business procedures and records and to the study and solution of problems inherent in the position of Treasurer of the Society.

*Be it resolved*, That the Society for American Archaeology, in view of the threatened destruction of archaeological records by the Federal River Valley projects, record its recognition and appreciation of the significant efforts with relation to this subject made in behalf of our science by the Committee for the Recovery of Archaeological Remains (J. O. Brew, Frederick Johnson, A. V. Kidder, and Wm. S. Webb).

*Be it resolved*, That the Society for American Archaeology express its appreciation of the support given archaeological research in the threatened valley areas by the Smithsonian Institution and record its recognition of the services to our science rendered by Frank H. H. Roberts, Jr. as director in charge of the archaeological surveys and excavations conducted under the administration of the Smithsonian Institution in cooperation with the National Park Service, the Corps of Engineers, and the Bureau of Reclamation.

Reporting for the Nominating Committee, J. O. Brew, Chairman, presented the following slate of officers:

| | |
|---|---|
| President: | Frederick Johnson |
| First Vice-President: | Earl H. Morris |
| Second Vice-President: | Isabel Kelly |
| Secretary: | Waldo Wedel |
| Treasurer: | Glenn A. Black |
| Members of the Executive Committee: | Philip Phillips |
| | Gordon R. Willey |

There being no nominations from the floor, the Secretary was instructed to cast a unanimous ballot for the official slate, and the officers were thereupon declared elected.

The annual business meeting was adjourned at 5:55 P.M.

## OTHER SESSIONS

At the Friday morning session, Provost James P. Adams welcomed the Central States Branch and the Society on behalf of the University of Michigan. The following papers were read, with President Byers presiding:

1. "Site Dating by Use of Petroglyphs." R. M. TATUM, U. S. Naval Academy. (Read by title.)
2. "Prehistoric Basketry from Central California." WILLIAM J. WALLACE, Indiana University.
3. "The Archaeological and Physical Affiliations of the Karankawa." GEORG K. NEUMANN, Indiana University.
4. "Some Recent Views of Mitla, Monte Alban, and Palenque." KIDS COLLINS, Detroit, Michigan.
5. "Hopewell Sites in Calhoun County, Illinois." DR. P. F. TITTERINGTON, Saint Louis, Missouri.
6. "The Snyder Site, Calhoun County, Illinois." JAMES B. GRIFFIN, University of Michigan.
7. "Prehistoric Illinois Indians. What Did They Look Like?" JOHN C. MCGREGOR, Illinois State Museum.

Frederick Johnson presided over the Friday afternoon session, when the following papers were presented:

1. "The Typology of George Lake Site 1." E. F. GREENMAN, University of Michigan.
2. "Stratigraphy in Northeastern Massachusetts." RIPLEY P. BULLEN, Phillips Academy.
3. "The Marginal Zone of the Owasco Culture." WILLIAM A. RITCHIE, Rochester Museum of Arts and Sciences.
4. "Prehistory of Trinidad in Relation to Adjacent Areas." IRVING ROUSE, Yale University.
5. "Toward a Synthesis of American Culture Horizons." ALEX KRIEGER, University of Texas.
6. "Recent Investigation of the Sterns Creek Complex of Eastern Nebraska." JOHN L. CHAMPE, University of Nebraska.
7. "Present Status of Japanese Archaeological Research with Respect to the Ainu Problem." BERTRAM KRAUS, University of Chicago.

An informal banquet, attended by members of the Central States Branch as well as of the Society, was held in the Michigan Union at 6:30 P.M. on Friday. Following the banquet, retiring President Byers presented the 1946 Viking Fund Medal and Award for Archaeology to A. V. Kidder on behalf of the Society. (For the citation accompanying this award, see AMERICAN ANTIQUITY, Vol. XII, No. 4, p. 268.)

Sessions were held Friday evening, Saturday morning, and Saturday afternoon under the auspices of the Central States Branch. In addition, the Society sponsored a symposium Saturday afternoon on the "Southern (née Buzzard) Cult," with James B. Griffin acting as interlocutor. A report on this symposium will be included in the next issue of AMERICAN ANTIQUITY. (*I. R.*)

# CONSTITUTION AND BY-LAWS OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY*

## CONSTITUTION

### ARTICLE I—NAME

The name of this organization shall be the SOCIETY FOR AMERICAN ARCHAEOLOGY.

### ARTICLE II—OBJECTS

*Section 1.* The objects of the Society shall be to promote and to stimulate interest and research in the archaeology of the American continents; to encourage a more rational public appreciation of the aims and limitations of archaeological research; to serve as a bond among those interested in American Archaeology, both professionals and non-professionals, and to aid in directing their efforts into more scientific channels; to publish and to encourage the publication of their results; to foster the formation and welfare of local archaeological societies; to advocate and to aid in the conservation of archaeological data; and to discourage commercialism in the archaeological field and to work for its elimination.

*Section 2.* The practice of collecting, hoarding, exchanging, buying, or selling archaeological materials for the sole purpose of personal satisfaction or financial gain, and the indiscriminate excavation of archaeological sites are declared contrary to the ideals and objects of the Society.

### ARTICLE III—POWERS

*Section 1.* The Society shall have the power to receive, administer, and disburse dues, assessments, and other grants to further its ends; to acquire, hold absolutely or in trust for the purposes of the Society, and to convey property, real and personal; to publish reports, bulletins, journals, and monographs; to affiliate with other organizations in the pursuit of common aims, and to appoint delegates or representatives to such organizations; to establish branches, sections, or divisions, on a regional or functional basis; and to engage in such other activities as are in keeping with the objects of the Society.

### ARTICLE IV—MEMBERSHIP

*Section 1.* The membership of the Society shall consist of two classes: Active Members and Benefactors.

*Section 2.* Persons in sympathy with the objects of the Society may be elected members. They shall give written subscription to the ideals, objects, and accepted standards of the Society.

*Section 3.* Residents of any country are eligible for membership.

*Section 4.* The Society shall not approve of applications for membership from persons who habitually misuse archaeological materials or sites for commercial purposes or who violate accepted standards of professional ethics.

*Section 5.* The Executive Committee may, by three-quarters vote, remove from the membership rolls any member whose acts are contrary to the ideals, objects, and accepted standards of the Society as set forth in Article II and Article IV, Section 4, or who otherwise makes improper use of his membership. The action of the Executive Committee may be subject to an appeal to the Society at its Annual Meeting.

### ARTICLE V—OFFICERS

*Section 1.* The Officers of the Society shall consist of a President, a First Vice-President, a Second Vice-President, a Secretary, a Treasurer, and an Editor. An Executive Committee shall be comprised of the President as Chairman, the First Vice-President, Secretary, Treasurer, Editor, and four members elected at large, provided that members of the Council shall serve as members of the Executive Committee until the expiration of their terms.

*Section 2.* Officers shall be elected at the Annual Meeting, shall assume office at the close of the Meeting, and shall serve until their successors are installed. The President and Vice-Presidents shall be elected for terms of one year, the Secretary, Treasurer, and Editor shall be elected for terms of four years. The four members at large of the Executive Committee shall be elected for terms of two years, provided that in the elections in 1948 two members may be elected for a term of one year and two members elected for a term of two years.

*Section 3.* Subject to general directives and limitations imposed by the membership at the Annual Meeting, any Special Meeting, or by mail ballot, the Executive Committee shall have authority to execute on behalf of the Society all powers and functions of the Society, as defined in Article III and in the By-laws.

*Section 4.* The officers of the Society shall not be eligible for reelection until one year has elapsed after their last term of office provided that those who hold office by virtue of elections previous to 1948 shall serve out their terms in that office.

### ARTICLE VI—MEETINGS

*Section 1.* The Society shall hold an Annual Meeting at a time and place to be designated by the Executive Committee. The attending members shall constitute a quorum. At this meeting the business of the Society shall be transacted, archaeological papers and other matters of scientific interest presented, and symposia and discussions may be held.

*Section 2.* Special, Joint, or Regional Meetings may be called by the President at any time with the consent of the Executive Committee, and shall be called by him upon direction by the Executive Committee. At such meetings the only business which may be transacted shall be that which is specified in the call.

*Section 3.* An annual meeting of the Executive Committee shall be held before the Annual Meeting of the Society. Special meetings of the Executive Committee may be held at the call of the President. The President shall call a special meeting of the Executive Committee at any time upon the written demand of at least three members thereof.

*Section 4.* Specific questions may be decided by the Society at its Annual or Special Meetings or by mail ballot.

### ARTICLE VII—COMMITTEES

*Section 1.* Unless otherwise provided the President shall appoint all committees, representatives, and delegates of the Society with the approval of the Executive Committee. The Executive Committee shall express its approval or disapproval within two weeks of the date upon which nominations are submitted to it.

### ARTICLE VIII—AMENDMENTS

*Section 1.* This constitution may be amended by a two-thirds vote of the members present at an Annual Meeting or at a Special Meeting. The constitution may also be amended by mail ballot provided that a proposed amendment is approved by two-thirds of the votes cast.

*Section 2.* Amendments may be proposed by the Executive Committee or by any ten members of the Society. The proposed amendments shall be circulated to the members of the Society by the Secretary at least thirty days before the Annual Meeting or Special Meeting. In the case of a mail ballot, as provided above, the Secretary shall allow thirty days for the return of mail ballots. An amendment shall go into effect immediately upon approval unless otherwise specifically provided.

* Form proposed by the Committee to Consider Revision of the Constitution and adopted at the Annual Meeting of the Society, May 16, 1947. The Constitution and By-Laws as originally adopted appear in AMERICAN ANTIQUITY, Vol. I, No. 2, pp. 146–51 (1935); there is a previous revision of the Constitution in Vol. VIII, No. 2, pp. 206–8 (1942).

*Section 3.* The amendments and provisions of this Constitution, as approved at the Annual Meeting, May 16, 1947, shall be effective immediately upon its adoption and shall supersede and nullify all previous constitutional enactments in conflict with them and all amendments and provisions not mentioned herein. The officers elected at the annual meeting on May 16, 1947, shall complete their terms without required reelection.

## BY-LAWS

### ARTICLE I—MEMBERSHIP

*Section 1.* Applications for membership in the Society shall be submitted to the Secretary. They shall state the business or professional connections of the applicant and the nature of his interest in American archaeology. Applicants shall be considered subscribers upon receipt of the subscription fee. The Secretary shall elect or reject applications for membership. In arriving at his decision he may consult the members designated under the provisions of Article VI, Section 3. In the event an applicant for membership is rejected he, or three members acting for him, may appeal to the Executive Committee whose decision shall be final.

*Section 2.* The Annual Dues of Active Members shall be $6.00.

*Section 3.* Any Active Member may become a Benefactor by the payment at one time of $500.00 or more.

*Section 4.* Each Active Member shall receive all the Society's publications for the fiscal year covered by his dues and shall have one vote in the transaction of the business of the Society. He shall be eligible for any elective or appointive office in the Society, subject only to restrictions defined elsewhere in the Constitution and By-Laws.

*Section 5.* Life Members as of May, 1947 and Benefactors shall have during their lives all the privileges of Active Membership but shall be exempt from the payment of dues. Benefactors may designate a library or other scholarly institution which shall, without further payment, receive in perpetuity all the regular publications of the Society. Such publications shall be in addition to those which shall be received by the Benefactor.

*Section 6.* Any person, library, museum, university, school, or other institution may subscribe to the publications of the Society without privilege of membership. The annual rate of subscription shall be the same as the dues of Active Members.

### ARTICLE II—ELECTIONS

*Section 1.* Before June 30th of each year the President shall submit a list of at least six names to the Executive Committee. From this list the Executive Committee shall, by preferential voting, elect a Nominating Committee of three.

*Section 2.* The Nominating Committee may nominate for each vacant office not more than three candidates who have indicated their willingness to serve, subject to the provision of the Constitution, Article V, Section 4. The list of nominees shall be sent to the Secretary for distribution in accordance with the terms of Article V, Section 1. Any five members may nominate an additional candidate for any vacant office, provided their nomination is submitted to the Nominating Committee at least thirty days before the annual meeting. In the event of the death or inability to serve of any nominee, candidates may be nominated from the floor at the Annual Meeting.

*Section 3.* The President shall appoint without review by the Executive Committee, and whenever necessary, two tellers who shall act with the Secretary as an Elections Committee. The Secretary shall be chairman of the Committee. Elections shall be administered by this Committee.

*Section 4.* Voting shall take place at the Annual Meeting. Each Active Member present shall be entitled to vote for one candidate for each office on ballots provided by the Secretary. The candidates for an office receiving the highest number of votes shall be declared elected to that office. In the event of a tie vote, the Elections Committee shall hold a run-off election at the Annual Meeting.

### ARTICLE III—DUTIES OF OFFICERS

*Section 1.* The President shall be the presiding officer of the Society.

*Section 2.* The President and either the Secretary or the Treasurer shall sign all written contracts authorized by the Executive Committee, except that basic contracts for printing and other matters necessary to publication shall be signed by the President and Editor.

*Section 3.* The First Vice-President shall assume the duties of the President in the event of the absence, death, resignation, or incapacity of the President.

*Section 4.* The Second Vice-President shall assume the duties of the First Vice-President in the event of the absence, death, resignation, or incapacity of the President or of the First Vice-President.

*Section 5.* The Secretary shall maintain the central office of the Society, which shall serve as a clearing house and advisory center on archaeological matters. He shall have general charge of administrative matters under the direction of the President. He shall act as Secretary of the Executive Committee. He shall make an annual report. He shall transmit to the Editor all information of general archaeological interest. He may, subject to authorization and budgetary provision by the Executive Committee, employ clerical assistance.

*Section 6.* The Treasurer shall administer the finances of the Society subject to the budget and other regulations approved by the Executive Committee. He shall maintain proper and adequate records which at all times shall be open to the inspection of the Executive Committee. Prior to each Annual Meeting he shall submit a budget for the ensuing year to the Executive Committee. He shall render an annual report. He shall maintain the membership list and provide the mailing list for publications of the Society. He shall have charge of the care and sale of surplus copies of publications. He may be required to give bond and may, subject to authorization and budgetary provision by the Executive Committee, employ clerical assistance.

*Section 7.* The Editor shall have full charge of all publications of the Society under the direction of the Executive Committee. He may, with the approval of the Treasurer, enter into agreements with individuals and institutions for financing publications. He shall certify to the Treasurer all bills relating to publishing obligations. He shall render an annual report. He may, subject to review by the Executive Committee, appoint Associate and Assistant Editors who shall, as far as practicable, represent the various geographic or cultural areas and fields of interest in American archaeology. The Associate and Assistant Editors shall serve concurrently with, and under the direction of, the Editor and shall be responsible to him. The Editor may, subject to authorization and budgetary provision by the Executive Committee, employ clerical and editorial assistance.

### ARTICLE IV—AFFILIATIONS, BRANCHES, ETC.

*Section 1.* Independent Societies whose objects are compatible with those of the Society for American Archaeology may become branches, sections, or divisions by vote of the Annual Meeting, provided that the presiding officer and at least half the membership of such independent Societies shall be and remain members of the Society for American Archaeology.

### ARTICLE V—MEETINGS

*Section 1.* Due notice of the place and date of the next Annual Meeting and of the list of nominees for vacant offices shall be given all classes of membership at least two months in advance. In so far as practicable, announcements, accompanied by a preliminary program, shall be sent to members at least two weeks in advance of the date of the meeting. Notices of special meetings shall be sent to members at least one month in advance.

### ARTICLE VI—COMMITTEES, APPOINTMENTS, ETC.

*Section 1.* The President shall appoint, as provided in Article VII, Section 1 of the Constitution, Auditing and Program Committees, which shall hold office for one year or until their successors are installed. He may appoint, as provided in Article VII, Section 1 of the Constitution, such additional committees as may from time to time be required.

*Section 2.* The President shall appoint, as provided in Article VII, Section 1, of the Constitution, delegates or representatives of the Society.

*Section 3.* The President may designate without review members in various regions to advise the Secretary concerning the qualifications of applicants for membership and concerning the status of archaeological research in the respective regions.

### ARTICLE VII—DUTIES OF THE EXECUTIVE COMMITTEE

*Section 1.* The President may, on his own initiative, or shall, at the written request of any member of the Executive Committee, ask the Committee to vote on specific questions by mail ballot.

Questions shall be decided by the Executive Committee by a majority of the votes cast. A quorum of the Executive Committee shall consist of a majority of its membership. In the case of a tie vote the decision of the President shall be final. If any member of the Executive Committee is

unable to attend a meeting he may, by written proxy, appoint another member of the Society to attend and vote in his stead. But no person by virtue of holding proxies shall have the right to cast more than one vote.

Voting may be held at a meeting of the Committee or by mail. In the event of a mail ballot the date by which the ballots must be received in order to be counted shall be specified in the call.

*Section 2.* The Executive Committee shall have the power to make interim appointments to fill a vacancy in an office until elections are held.

*Section 3.* At its annual meeting the Executive Committee shall take action on the budget presented by the Treasurer.

ARTICLE VIII—MAIL BALLOT

*Section 1.* Questions may be submitted to the members of the Society and voting thereon may be by mail ballot upon the initiation of the Executive Committee or a signed petition to the Executive Committee by any ten members. The ballots shall be returned within sixty days to the Secretary who shall certify the vote to the Executive Committee. A majority of the votes received shall constitute a deciding vote.

ARTICLE IX—ANNUAL REPORT

*Section 1.* The Secretary shall compile the minutes of the annual meeting of the Society which shall include the reports of all officers, committees, delegates, and representatives required to make such reports. The minutes shall be published in the journal.

ARTICLE X—FINANCES

*Section 1.* The fiscal year of the Society shall begin May 1.

*Section 2.* Annual dues shall be payable on May 1. Members 90 days in arrears shall not be entitled to receive the Society's publications or to vote, and those one year in arrears may, after final notification, be dropped from the rolls. Members thus dropped may be reinstated by payment of their arrearages, in which case they shall receive the withheld publications, or they may be reelected.

*Section 3.* Payments made to establish Life Memberships and Benefactorships, and such other moneys as may from time to time be designated for that purpose, shall constitute a Permanent Fund which shall be invested in the name of the Society. The Executive Committee may direct the transfer of sums of money from the Permanent Fund to the Working Fund provided that the total of the Permanent Fund is never reduced below the total sum of payments of all living Life Members, all Benefactors, and all sums which must remain in the Permanent Fund by conditions under which they may have been received.

*Section 4.* The income from annual dues and from investments and other sources shall constitute the Working Fund, available for such publications and other current expenses consistent with the purposes of the Society as the Executive Committee may direct.

*Section 5.* The Trustees of the Permanent Fund shall consist of two members of the Society and the Treasurer, *ex officio*. The Trustees shall be appointed by the Executive Committee for terms of eight years, provided that in 1947 one Trustee shall be appointed for a term of four years.

*Section 6.* No financial obligation in excess of funds available in the treasury shall be assumed by the Executive Committee or by any officer on behalf of the Society except when approved by a two-thirds vote of the membership of the Society present at a regular Annual Meeting or at a Special Meeting; provided that for the purpose of this section, estimated receipts from annual dues for the current year may be considered as available funds.

ARTICLE XI—AMENDMENTS

*Section 1.* These By-Laws may be amended by a majority vote at a regular or special meeting of the Society, or by mail ballot.

*Section 2.* The provisions of these By-Laws, as approved May 16, 1947, shall be effective immediately upon their adoption and shall supersede and nullify all previous enactments in conflict with them. The proceedings at the Annual Meeting in May, 1947, shall stand without further confirmation.

# MEMOIRS

## of the

# SOCIETY FOR AMERICAN ARCHAEOLOGY

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# TABLE OF CONTENTS

The Cultural Affiliations and Chronological Position of the Clear Fork Focus . . . . . J. CHARLES KELLEY 97

Burial Traits of the Headwaters Lakes Aspect in Manitoba . . . . CHRIS VICKERS 109

A Preliminary Definition of Archaeological Areas and Periods in Florida. . . . . JOHN M. GOGGIN 114

Archaeological Theory and Anthropological Fact . . . ADELAIDE KENDALL BULLEN 128

The Quantitative Investigation of Aboriginal Sites: Comparative Physical and Chemical Analysis of Two California Indian Mounds . . . S. F. COOK AND A. E. TREGANZA 135

Crania from the Warren Mounds and their Possible Significance to Northern Periphery Archaeology . . . . . WALTER D ENGER, JR., AND WILLIAM BLAIR 142

Stone Eating Utensils of Prehistoric New England . . . . . WILLIAM S. FOWLER 146

Ciudad Real: A Guaraní-Spanish Site on the Alto Paraná River . VIRGINIA DREW WATSON 163

## FACTS AND COMMENTS

Further Information on Projectile Points from Oregon . . . . . L. S. CRESSMAN 177

Note on an *Apocynum* Fabric . . . . . LILA M. O'NEALE 179

Pictographs from Tramping Lake, Manitoba . . . . . M. S. STANTON 180

A Unique Specimen of Pressure-Flaked Pyrite from St. Lawrence Island, Alaska . . . . . NORMAN AND ROMAYNE L. POTOSKY 181

Comments on a Site in the St. Marks National Refuge, Wakulla County, Florida . . . . . JOHN W. GRIFFIN 182

## BOOK REVIEWS

MARTIN, QUIMBY, AND COLLIER: Indians Before Columbus . . . . . Strong 184

LORANT: The New World . . . . . Fenton 189

MCKERN: Preliminary Report on the Upper Mississippi Phase in Wisconsin . Griffin 189

NOTES AND NEWS. . . . . 192

ANNUAL MEETING OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY, 1947 . . . . . 193

CONSTITUTION AND BY-LAWS OF THE SOCIETY FOR AMERICAN ARCHAEOLOGY . . . . . 198

AMERICAN ANTIQUITY IS INDEXED IN THE INTERNATIONAL INDEX

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97
109
114
128
135
142
146
163
177
179
180
181
182
184
189
189
192
193
198